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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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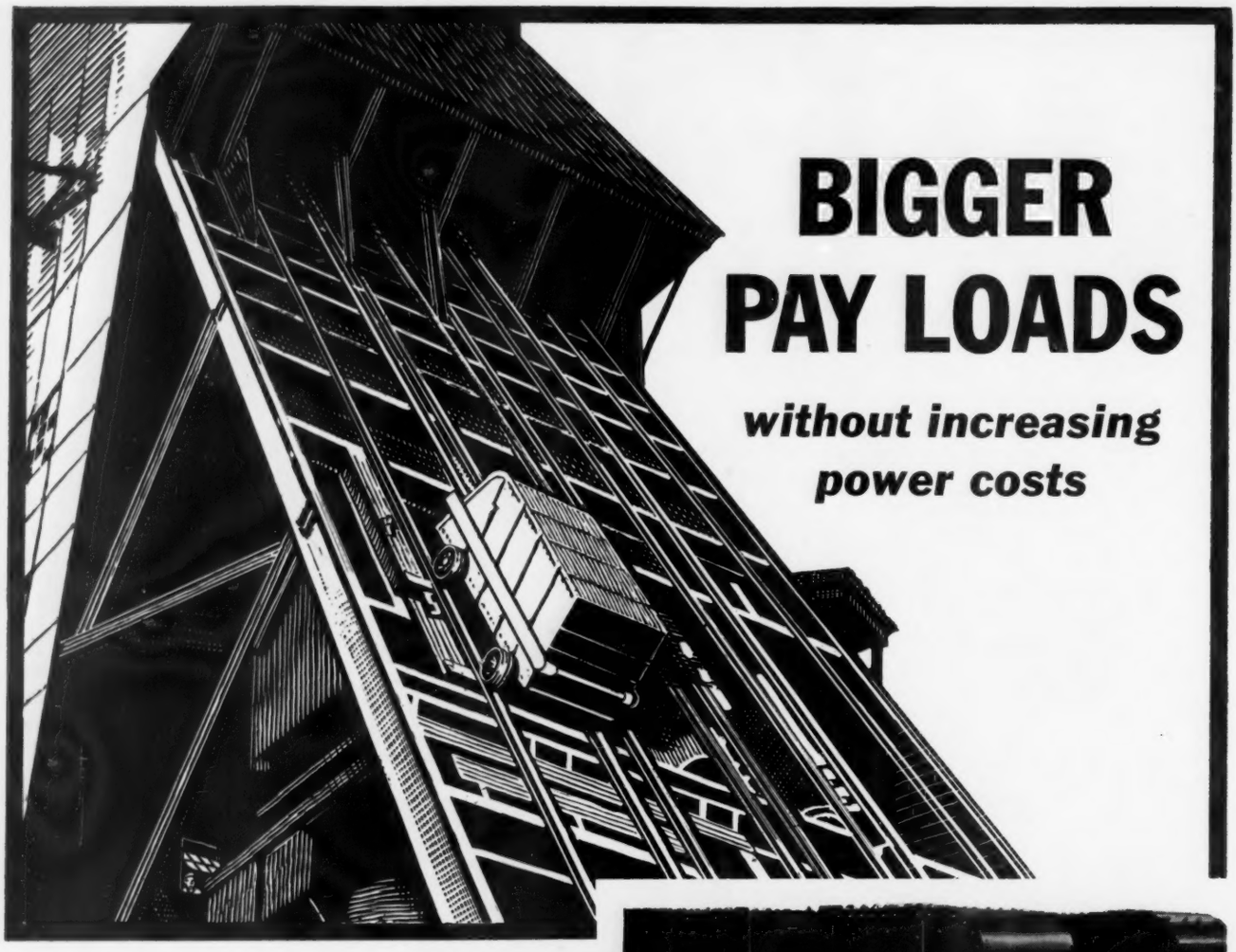
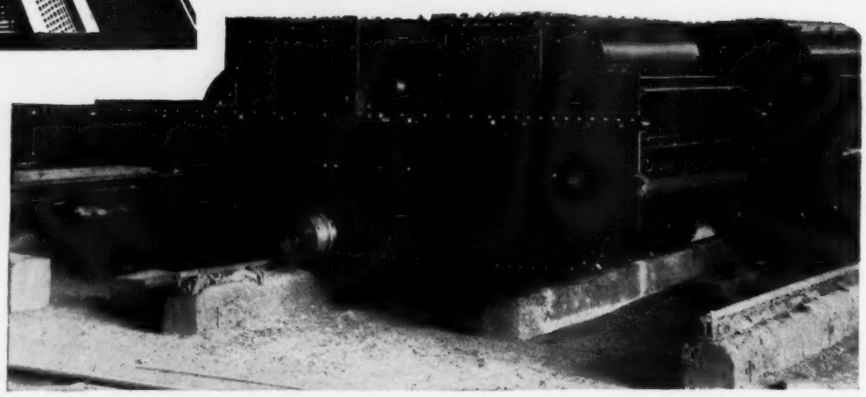


BIGGER PAY LOADS

without increasing power costs



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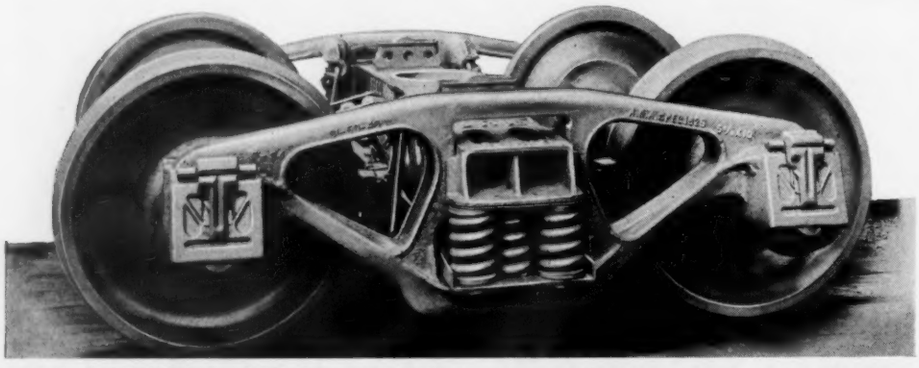

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ MANY steel producers and consumers find themselves in unchartered seas as the new f.o.b. mill pricing system unfolds. Both groups see the delivered cost of steel at the consuming plant as the vital consideration—and the implications are profound. For example, consumers close to the eastern seaboard now are able to obtain steel at their plants at the same delivered prices paid by Pittsburgh district consumers. With one-fourth of the country's population within 100-mile radius of New York's city hall, will industry tend to expand in that territory as a result of the new competitive situation? This is only one of many important questions now confronting those responsible for the future of industry. In the automotive industry (p. 25) the position of parts companies has been altered.

• • •

Wages in Balance

Whether any general wage reduction is in the offing in the steel industry is not yet clear but the industry's "white collar" workers last week (p. 17) took their second cut this year. . . . Many economists of late have looked to an annual wage plan as a desirable method of stabilizing purchasing power. Conclusion as a result of a thorough study (p. 21) is that such a plan is not feasible. . . . Amendment to the Clayton act is demanded by the federal trade commission in reporting (p. 20) on its investigation of the agricultural machinery industry; it would make it illegal for large corporations to purchase assets as well as the stock of competing companies. . . . Completion of England's first continuous mill (p. 17) injects another important factor in the world tin plate market.

• • •

Operations Picking Up

How's business? STEEL's index of industrial activity last week stood (p. 32) at 66.3 per cent as compared with 66 per cent in the preceding week. Ingot production dropped four points during the week (p. 19) but this was due to the holiday. A strongly accelerating trend was shown in the latter part of the week with indications of a slight advance this week. . . . At Washington (p. 29) two activities that will have an important bearing on industry's future are in process. The newly created national economics commission is preparing to push its anti-monopoly investigation and the department of state is preparing to organize a new division to administrate the new wage-hour law which will go into effect Oct. 24. . . . Bureau of reclamation plans to buy 32,945 tons of steel (p. 30) by Aug. 15.

• • •

Streamlining Marches On

Motion analysis methods (p. 34), highly developed in recent years, are permitting increased efficiency in hand operations at many plants. . . . An event further revealing the trend in railroad equipment is the completion (p. 36) of two streamlined, combination engine-express-mail-passenger units for use in branch line service where traffic is light. . . .Proper place of radiography in the field of inspection is receiving close attention, it was revealed (p. 37) at the recent annual meeting of the American Society for Testing Materials. . . . The cement molding process of late had undergone considerable improvement, it was reported (p. 39) at the recent convention of the Institute of British Foundrymen. . . . A new method (p. 46) eliminates welding stresses in high-strength alloys.

• • •

Plot Cost Curves

Electrode performance and power consumption are important items in welding costs; a method is suggested (p. 42) for plotting cost curves and thus permit closer control. . . . Flue dust losses are greatly reduced with a recently developed blast furnace practice (p. 48) which involves increased diameter of stockline. . . . A study of the steel microstructure prior to drawing prevents mill troubles and assures uniform, high quality wire; grain control (p. 54) should start with the original heat. . . . Fire hazards may be reduced (p. 53) by inexpensive methods of flame-proofing clothing, shields and the like. . . . Distortion in worm gears is reduced (p. 57) when the induction hardening method is used. . . . A new road truss (p. 64), formed of flat-rolled steel, may have wide possibilities.

E. L. Shaner

Prominent Railroad President Cites Advantages of High Tensile Steels

Comparing freight cars built of ordinary steel by a leading Railroad in 1928 with 1,000 new cars built by the same road in 1937, using high tensile low alloy steels, the President of the Railroad said:

"The new cars are stronger, possess greater durability and yet are 24% lighter per cu. ft. of carrying capacity than those built of ordinary steel 10 years ago."

We are proud of the fact that a large tonnage of Inland Hi-Steel was used in the construction of these new cars.

* * * * * * *

It is the purpose of Inland Hi-Steel to reduce weight without loss of structural strength . . . . to reduce the mileage cost of the waste load.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES
STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Consumers Find New Competitive Conditions In Steel Set-up

■ REVERBERATIONS continued to be heard in steel markets last week as additional producers joined the movement which has resulted in the virtual abandonment of the form of price basing system in effect for nearly 15 years.

In some respects the situation remained confusing as both buyers and sellers scanned prices and freight rates to determine how they were affected by this radical development.

The new plan, as reported in STEEL, July 4, is a long step toward the setting up of a basing point at each steel producing center. Not all mills have become basing points, and in a few instances differentials over Pittsburgh have been retained. Nevertheless, a sufficient number of new bases have been established—coupled with the abolition of Pittsburgh's price advantage over mills of other districts—to effect a marked equalization in the cost of steel delivered to various major consuming areas.

New Basing Points

In the East, Buffalo, Claymont, Del., Sparrows Point, Md., are new basing points on certain products, thereby making steel available to users in or adjacent to those cities at the same prices paid by consumers at Pittsburgh's doorstep.

Youngstown Sheet & Tube Co. has established Youngstown as a basing point on sheets and strip, adding further complications to the competitive situation in Ohio where the setting up by Republic Steel Corp. of Cleveland as a sheet base, with price parity with Pittsburgh, already had upset previous price alignments.

The sheet price relationship was made still more complicated by establishment of a like base at Middletown, home of American Rolling Mill Co. An Ohio sheet buyer now has three basing points within his state, making him in most instances a more attractive sales prospect than formerly for at least one producer.

At Chicago, Acme Steel Co. made that city a base for cold-rolled strip, but retained a differential of $2 a ton over Pittsburgh and Cleveland. Formerly a Chicago district consumer bought cold strip from local as well as outside producers at a price representing the Pittsburgh-Cleveland base, plus freight from Cleveland of 31 cents per 100 pounds. Until the last cut this meant a delivered quotation of 3.41c. With the new Chicago base of 3.05c, the consumer need pay a freight bill of only the 3-cent switching charge or a total sum of 3.08c, a saving of $6.60 a ton.

Similar marked economies to the consumer have resulted elsewhere, Implications of new price schedules, it is apparent, are broader than appears at first glance. For example competing manufacturers of certain products that are made largely of steel may have their costs of material affected in varying degree by the price revisions. Consequently, the competitive position of not only the producer of steel but of the consumer as well has been altered.

Railroads also are affected by the new price scheme and not al-

How Steel Basing Point Map Has Changed

together favorably. Track material prices are not included in recent reductions, but there is a material saving in cost of other steel products used widely by the railroads.

On the other hand, the carriers see grave cause for concern over the emphasis which the new basing point setup places upon low transportation costs. Water and truck hauls, where possible and where a saving in cost results therefrom, undoubtedly will be stimulated to the disadvantage of the traffic-starved railroads. Whether this loss of business will offset the benefit resulting from lower cost of materials purchased remains to be seen.

Eastern Situation Complicated

One outcome of the revised prices has been a protest from some steel consumers who find their business has become localized thereby. For example, eastern makers of automotive parts complain they now are unable to compete satisfactorily in midwestern markets, and at least one company has taken steps to enter other lines. Rumors in the East were to the effect that the entire steel pricing system was under review, with the possibility that certain inequalities might be rectified within the next few weeks. As a result, many steel users are delaying quoting customers on manufactured products.

Most steel executives have been slow to comment on the price upheavel, principally because it has required time to study the revised picture and to weigh its advantages and disadvantages.

While a number of observers have pointed out that Pittsburgh has lost its dominant position as the master regulator of prices in other districts, it is obvious that producers in other areas have surrendered no small sum in the former price differential.

Most of these latter mills sold the bulk of their output to consumers relatively nearby — where the full base could be charged without freight absorption—and the differential of $1 or more a ton meant so much extra return to the producer. This advantage is now lost.

Steel sellers likely will retain their distant customers unless elimination of differentials makes it necessary to absorb so much freight that the accounts would be highly unprofitable. Hence the mills affected to the greatest extent financially by the latest price changes are the ones which previously derived the largest proportion of their business from accounts far afield. Now it becomes mandatory for them to absorb a sizable portion of freight charges to point of destination, to meet the competition of more adjacent mills.

Offhand, it would appear that Pittsburgh mills are in a less favorable position than Chicago, Cleveland or Detroit producers. Carnegie-Illinois Steel Corp. is aided by its location of steelworks in both Pittsburgh and Chicago, enabling it to tap the markets of both the East and Central West. Republic and National Steel have the edge in Detroit. Republic and Tennessee Coal, Iron & Railroad Co. have improved their competitive position in the far South and Southwest. Pittsburgh and Wheeling district interests still have an ally in river transportation and its low freight cost in reaching the southwestern market.

Rumors regarding the motivating force behind the price upheavel have been plentiful. Little consideration has been given to the fact that on the basis of costs and diversification of products there is ample reason why steel should be available at Chicago and Birmingham as cheaply as it can be sold at Pittsburgh. Most explanations have concerned themselves with other factors, chiefly political.

Administration officials for a number of months have contended that steel prices were too high, therefore the reduction is construed as a concession to Washington. Secretary of the Interior Harold L. Ickes last week applauded action of the steel companies, pointing out that with the government launching a large public works program, lower prices will buy more steel, create more work. He urged manufacturers of other building products to follow suit.

In the meantime the industry is disposed to wait—to see the effect price reductions will have on business—before deciding what to do about wages.

STEEL'S HOURLY WAGE EARNINGS 83.6 CENTS

Payrolls of the steel industry in May amounted to a total of $46,757,000, about 2.2 per cent less than the April total of $47,809,000, according to the American Iron and Steel institute.

The decline was approximately one third as large as the drop of 6.1 per cent in steel output in May, compared with April.

A total of 436,000 employes were on the payrolls during May, compared with 445,000 in April. This represented the smallest decline in

Indexes of Steel Wage Rates, Production and Prices

employment in any month since last October.

Between May, 1937 and May 1938, steel production dropped about 65 per cent, while the number of employes declined less than 27 per cent and total payrolls declined less than 50 per cent. In May, 1937, the industry employed 595,000 men, and had a payroll of $92,931,000.

Wage-earning employes earned an average of 83.6 cents an hour in May, or a cent an hour more than the average of 82.6 in April. In May, 1937, when the higher rate of operations necessitated some overtime work, for which one and one-half times the normal rate is paid, wage-earning employes earned an average of 86 cents an hour.

The number of hours worked per week by wage earners in May averaged 24.4, which compares with an average of 25.6 hours per week in April, and with 38.6 hours a week in May, 1937.

FURTHER REDUCTION MADE IN OFFICE HOURS AND PAY

Carnegie-Illinois Steel Corp. has put in effect the second reduction in pay of "white collar" workers this year. On Feb. 1 office workers, including sales staffs, were reduced from 5½ days to 5 days a week with a corresponding decrease in income. A selective reduction now has been made, further curtailing the week for some employes to 4 days or 4½ days, with a corresponding reduction in salary.

Britain's First Continuous Mill To Be Strong Factor in World Tin Plate

■ JUST RETURNED from a hasty trip to England, William H. Davey, president, W. H. Davey Steel Co., Cleveland, foresees Richard Thomas & Co., leading English steelmaker, becoming an increasingly important factor in the tin plate trade of the world on completion this fall of its new continuous mill at Ebbw Vale.

First of its kind in England, the new Richard Thomas mill is a duplicate of the Ford Motor Co. strip mill at Detroit. It is the realization of the vision of Sir William Firth, chairman of Richard Thomas & Co., who has overcome almost incredible obstacles within both the banking world and the steel industry of England in pushing it to completion.

On Aug. 1 commercial production of hot strip on the new mill will be started, and the entire plant, including its tin plate capacity, will be in operation by Sept. 1. Located only 15 miles from the docks at Newport, and 20 miles from Cardiff, the new mill offers an unusual combination of quality and location to compete in the export markets of the world.

The new Richard Thomas plant at Ebbw Vale, which is in Monmouthshire, is 2½ miles long from coal mine to tin plate plant, with production flowing in a straight line. According to Mr. Davey, the layout is so extensive that it is difficult to grasp.

Adjacent to supplies of coking coal, considered the best in England and available without a freight haul, 100 new by-product coke ovens with a monthly capacity of 30,000 tons of coal have been erected. These supply two remodeled blast furnaces each having a daily capacity of 600 tons of pig iron.

Nearby are the bessemer and open-hearth plant, the new blooming mill, the continuous strip mill which, as noted, is a duplicate of the Ford mill, a three-stand continuous cold sheet mill, and a five-stand continuous tin plate mill.

All material is annealed in Wilson type furnaces in coils. For skin passing two 4-high continuous mills are used. Material is cut to size after skin passing, then goes to white pickling, and then to the tin house which has an annual capacity of 3,000,000 boxes. Half of the tin house is equipped with Mellin-Griffin tin pots, and the other half with Poole-Davis pots.

Annual capacity, as previously noted, includes principally 3,000,000 boxes of tin plate; 240,000 tons of sheets can be rolled; and the remainder of the output will be in hot strip form.

Late in June the financing for the project was completed, making available the £6,000,000 addition required. Of this sum £5,500,000 in new prior lien stock has been subscribed privately by leading banks, and the remainder by the subscription by important London interests of 1,500,000 additional 6s 8d ordinary shares at par.

Interest Increased

This financing is accompanied by modifications of other issues. The interest on £7,000,000 redeemable first mortgage debentures is being increased from 4 per cent to 4½ per cent.

The existing preference shares will be entitled to a cumulative dividend of 6½ per cent, tax free up to 6 shillings in the pound.

In the year ended April 1, 1938, the actual earnings of Richard Thomas & Co. were £2,136,000, and after allowing £300,000 interest on debentures on the new plant at Ebbw Vale and all other charges, net earnings on ordinary shares amounted to 17 per cent.

H. A. Brassert & Co., Chicago, were in charge of rebuilding the blast furnaces and erecting the coke ovens and the steel plant. The

Scrap Moves Up, While Pig Iron Goes Down

■ **The reduction of $4 a ton in pig iron, with a rise of $1.85 in the scrap composite is one of the seeming inconsistencies of the present market situation. Both are part of the general readjustment. Great mounds of scrap, such as these outside the Pontiac Motors foundry, will move quickly—despite a lower pig iron price—with pickup in motorcar production**

United Engineering & Foundry Co., Pittsburgh, collaborating with the Davy United Co. of England, built the continuous mill.

In charge of strip operation Ebbw Vale is S. E. Graeff, formerly with the American Rolling Mill Co., Middletown, O. Joseph Echols, formerly in charge of the Niles tin plate mill of Republic Steel Corp., is supervising the tin plate division. Arthur White, formerly of the Otis Steel Co., Cleveland, the American Sheet & Tin Plate Co., Pittsburgh, and the Follansbee Bros. Co., Follansbee, W. Va., is metallurgist.

"Efficient Plant"

Mr. Davey, long a personal friend of Sir William Firth, who has often visited in this country, is a director of the Groves End Steel & Tin Plate Co., principal subsidiary of Richard Thomas & Co. Also associated with Sir William and members of his boards of directors are the governor of the Bank of England, and Sir Henry Duncan, of the British Iron and Steel Federation.

Sir William is the European representative of tin plate interests on the steel cartel, and is presiding at a meeting now being held at Baden-Baden, where incidentally, William Todd, former sales manager of Jones & Laughlin and now European representative of the American Steel industry, is in attendance.

Richard Thomas & Co. has just spent £1,000,000 remodeling the blast furnaces and erecting 80 new coke ovens at its steel plant in Reabourne, Lincolnshire.

"I have never seen a more complete or efficient plant of its kind," said Mr. Davey last week. "Not only are its assembly costs low on account of the proximity of raw materials, but its location only 15 to 20 miles from leading Welsh ports puts it in a premiere position to compete for world business in flat-rolled products and tin plate. The vision of Sir William Firth in erecting this only continuous mill in Great Britain is not even yet comprehended by the steel industry of England."

Commenting upon the situation in England, Mr. Davey found the steel industry there operating at 42 per cent. The English people, he learned, are opposed to war, but are spending £1,000,000 a day preparing for it, or rather to avert it.

In contrast to the wrangling between capital and labor in the United States, he found the first interest of the British to be the empire, and second only to that, industry.

Always interested in housing, Mr. Davey inspected some of the London county council projects in a belt about 20 miles outside of London. On lots 50 x 150 feet, two-family, side-by-side brick houses have been erected, selling for £675 to £900 per side for five or six rooms, with all modern conveniences except cellars.

This low cost housing is due to the fact that the average building trade wage in England is 45 cents per hour, and the maximum 60 cents.

"I do not see how the American housing problem is ever going to be solved so long as building trades labor demands $1.50 per hour for erecting houses for workers averaging 80 cents per hour or less," said Mr. Davey.

The British have avoided the pitfall into which the American housing program has fallen by avoiding the construction of low price housing in congested areas.

Commenting on the reductions in the price of steel and the enlargement of the basing point system, which occurred during his absence, Mr. Davey said that the lot of non-integrated mills is made the harder by the shaving of only $3 per ton off the price of semifinished steel while, in Cleveland for example, the f.o.b. price of flat rolled steel is lowered $7.

"If the administration is in accord with this manner of helping 'the little fellow' then I cannot understand it," said Mr. Davey.

Freight Car Orders 90 Per Cent Under 1937

■ Class I railroads June 1, 1938, had 4484 new freight cars on order, the Association of American Railroads states. On the same date in 1937, 45,176 were on order, and June 1, 1936, 25,748. May 1, this year, 4867 were on order.

New steam locomotives on order June 1 totaled 56, compared with 329 June 1, last year, and 58 June 1, 1936. Sixty-one were on order May 1, this year. New electric and diesel locomotives on order June 1 totaled six compared with 30 June 1, 1937, and 30 June 1, 1936. Ten were on order May 1 this year.

Board Gives Steel Plant Rail Workers to SWOC

■ The National Labor Relations board has dismissed the certification petition filed by Order of Railway Conductors of America on behalf of brakemen and conductors employed by Wheeling Steel Corp. at its Steubenville, O., plant. The board held they do not constitute a unit "appropriate for collective bargaining."

It considered the steel workers' organizing committee's argument that they should be regarded as part of an extensive industrial unit consisting of all employes of the company.

"SWOC holds a contract with the company for its members only, on the basis of the larger unit," the board said. "Evidence established that the company regards the yard transportation unit as an integral part of the steel production force; that conductors and brakemen share in general wage increases; that the plant railroad on which they work is not a common carrier."

Building More Steel Barges at Mobile

■ **First of ten modern all-welded steel cargo barges built by Ingalls Iron Works Co. at its Mobile, Ala. shipyard (on the Gulf) for the Inland Waterways Corp. These hopper barges weigh approximately 600 tons each, are 280 x 48 x 11 feet. Recent launching was attended by a large group of industrialists from Mobile and Birmingham**

June Ingots in 9 Per Cent Drop

■ PRODUCTION of steel ingots in June totaled 1,638,277 gross tons, about 9 per cent less than 1,806,805 tons in May, according to the American Iron and Steel institute. In June, 1937, 4,184,723 tons were produced.

June operations were at an average of 28.46 per cent of capacity, compared with 30.39 per cent in May, and 74.48 per cent in June, 1937. The weekly average output in June was 381,883 tons, in May 407,857 tons, and in June, 1937, 975,460 tons.

Production for six months this year amounted to 10,819,144 tons, compared with 28,758,960 tons in the first half of 1937, a decline of 62 per cent. Operations for first half averaged 31.17 per cent, against 84.88 per cent in first half last year. Weekly production in the first half this year averaged 418,212 tons. In the corresponding period of 1937 it was 1,111,672 tons.

■ May 13, 1939 will be Columbia Steel Co. day at the Golden Gate international exposition on Treasure Island, in San Francisco bay. Special ceremonies will commemorate the company's part in building the 8¼-mile San Francisco-Oakland bridge.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended July 9	Change	Same week 1937	Same week 1936
Pittsburgh	15	— 8	67	64
Chicago	24	— 3	70	71
Eastern Pa.	22	— 5	65	49
Youngstown	27	— 1	76	74
Wheeling	44	+ 6	77	69
Cleveland	15.5	— 7.5	47	84.5
Buffalo	30	+ 2	88	86
Birmingham	42	None	96	52
New England	33	+10	80	68
Cincinnati	36	+ 8	93	80
St. Louis	33.3	None	93	†
Detroit	29	None	95	100
Average	24	— 4	74	69.5

†Not reported.

Auto Output Off Sharply

■ Automobile production last week at 25,375 was 15,570 less than in the week preceding, a decline larger than would be proportionate for only the July 4th holiday, according to *Ward's Reports*.

	Week Ended July 9	July 2
General Motors	15,175	16,900
Chrysler	4,710	5,945
Ford	1,600	12,810
All Others	3,890	5,290

Monthly and yearly comparisons will be found on page 26.

Steel Ingot Statistics

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.29 per cent in 1936

1938	—Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	—Total— Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
Jan.	1,632,773	30.25	99,991	18.27	1,732,764	29.15	391,143	4.43
Feb.	1,578,233	32.38	125,493	25.40	1,703,726	31.74	425,931	4.00
March	1,854,669	34.36	157,737	28.83	2,012,406	33.85	454,268	4.43
April	1,793,522	34.31	131,644	24.84	1,925,166	33.44	448,757	4.29
May	1,676,215	31.06	130,590	23.87	1,806,805	30.39	407,857	4.43
June	1,519,589	29.07	118,688	22.40	1,638,277	28.46	381,883	4.29
6 mos.	10,055,001	31.90	764,143	23.91	10,819,144	31.17	418,212	25.87
1937								
Jan.	4,426,227	84.07	292,209	54.38	4,718,436	81.32	1,065,110	4.43
Feb.	4,083,070	85.89	331,629	68.34	4,414,699	84.27	1,103,675	4.00
March	4,814,926	91.45	403,400	75.07	5,218,326	89.94	1,177,952	4.43
April	4,682,084	91.83	388,783	74.71	5,070,867	90.25	1,182,020	4.29
May	4,769,238	90.59	382,671	71.21	5,151,909	88.79	1,162,959	4.43
June	3,900,108	76.50	284,615	54.69	4,184,723	74.48	975,460	4.29
6 mos.	26,675,653	86.76	2,083,307	66.38	28,758,960	84.88	1,111,672	25.87
July	4,220,848	80.10	335,456	62.56	4,556,304	78.48	1,030,838	4.42
Aug.	4,504,567	85.29	373,259	69.46	4,877,826	83.83	1,101,089	4.43
Sept.	4,021,035	78.80	268,472	51.71	4,289,507	76.30	1,002,221	4.28
Oct.	3,204,209	60.67	188,715	35.12	3,392,924	58.31	765,897	4.43
Nov.	2,040,480	39.90	113,885	21.88	2,154,365	38.23	502,183	4.29
Dec.	1,386,188	26.31	86,833	16.19	1,473,021	25.37	333,263	4.42
Total	46,052,980	74.20	3,449,927	54.54	49,502,907	72.38	949,423	52.14

Percentages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross tons of open-hearth ingots and 123,514 gross tons of bessemer ingots, total 1,341,856 gross tons; based on annual capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross tons; bessemer ingots, 6,440,000 gross tons.

Percentages of capacity for the first six months of 1937 are calculated on weekly capacities of 1,188,452 gross tons for open-hearth ingots, 121,308 tons for bessemer and 1,309,760 tons total, based on annual capacities as of Dec. 31, 1936, as follows: Open-hearth ingots, 61,965,862 gross tons; bessemer, 6,325,000 tons; beginning July 1, 1937, on weekly capacities of 1,192,182 gross tons open-hearth ingots and 121,308 gross tons bessemer, total 1,313,490 gross tons; based on annual capacities as follows: Open-hearth ingots, 62,160,362 gross tons; bessemer, 6,325,000 gross tons.

PRODUCTION

■ HOLIDAY interruptions cut deeply into steel production last week, reducing the national rate 4 points to 24 per cent. Late in the week activity accelerated and for this week there is indication that all the holiday loss will be made up, and possibly the rate may exceed that preceding last week.

Youngstown, O.,—Down 1 point to 27 per cent, with 27 open hearths and two bessemer converters in service. Holiday shutdown was nearly balanced by additional capacity engaged late in the week. Schedules for this week indicate an increased rate.

Cleveland—Down 7.5 points to 15.5 per cent, the lowest rate for this year. This week will see return to conditions before the holiday, Republic adding one and Otis Steel Co. two open hearths for the full week.

Chicago—Off 3 points to 24 per cent, due to the holiday, with an upturn expected this week.

Central eastern seaboard—Averaged 5 points lower at 22 per cent for the week, but rebounded to 27 per cent after the July 4 shutdown.

Cincinnati—Rose 8 points to 36 per cent as five open hearths were relighted by one interest.

Buffalo—Advanced 2 points to 30 per cent, highest for the year, with further increase seen for this week.

St. Louis—Unchanged at 33.3 per cent for the second week.

Birmingham, Ala.—Steady at 42 per cent, with 10 open hearths in operation.

Pittsburgh — Holiday shutdowns and vacations dropped the rate 8 points to 15 per cent last week, with a better schedule probable this week.

Wheeling — Resumption of two open hearths raised the rate 6 points to 44 per cent.

Detroit—Continued at 29 per cent, one furnace taken off for repairs being replaced by another.

New England — All works operating at least one furnace, the rate was lifted 10 points to 33 per cent, with the same schedule planned for this week.

■ Offices of the Iron and Steel institute and the Institute of Metals (British) have been moved to 4, Grosvenor Gardens, London, S. W. 1. Separate offices will be occupied in this building but committee and reading rooms will be shared. The libraries of the two institutes have been joined and will be operated for both bodies by the librarian of the Iron and Steel institute.

Tighten Clayton Act, Says Trade Commission in Implement Report

■ URGING amendment of the Clayton act to make illegal the acquisition by large corporations of the capital stock or assets of competing corporations, the federal trade commission last week completed its report on its investigation of the agricultural implement and machinery industry.

Concentration of control in the farm machinery industry in the hands of a few large companies, the report states, has been the result of acquisition of capital stock or assets of competitors before enactment of the Clayton act, and purchase of assets rather than capital stock since such enactment.

The Clayton act prohibits only the purchase by one company of the capital stock of another company where the effect may be substantially to lessen competition or tend to create a monopoly. It does not forbid purchase of factories, equipment or other physical assets, even though the result might be more effective than by purchase of capital stock alone.

Exempt Small Corporation

The recommendation is that section 7 of the Clayton act be amended to make it unlawful for any corporation, directly or indirectly, through a holding company, subsidiary or otherwise, to acquire any of the stock or assets of a competing corporation when either is engaged in interstate commerce. The recommendation provides the amendment shall not apply where the corporations involved actually control in the aggregate less than 10 per cent of the total output of any industry. The report states:

"The unsatisfactory situation with respect to this industry, from the public and consumer standpoint, is due primarily to the inadequate results achieved regarding the International Harvester dissolution case under the Sherman act and inadequacy of section 7 of the Clayton act. The facts in the harvester case disclosed that the harvester combination, a group of formerly competing companies, owned a major portion of the harvester industry; that because of such dominant position the International Harvester combination . . . was able to establish the prices for the harvester machinery industry . . . ."

The fact that the International Harvester Co. does not control as high a percentage of the production of certain farm implements and machines as it did 20 years ago is not proof of the existence of free and open competition in this industry, the report says, and any decline in the percentage of harvesting machine production controlled by International Harvester has been offset by increased control in other lines.

Pig Iron Value Soared in 1937

■ SHIPMENTS of pig iron from blast furnaces in the United States in 1937 amounted to 35,224,347 gross tons valued at $731,139,435, an increase of 14 per cent in quantity and 35 per cent in value over 1936. The general average value of all grades of pig iron at furnaces in 1937 was $20.76, compared with $17.59 in 1936, according to figures by the metal economics division, bureau of mines.

Total production of pig iron, exclusive of ferroalloys, in 1937 was 36,145,095 gross tons, an increase of 19 per cent over 1936 and the largest output since 1929.

The industry consumed 60,598,811 tons of domestic iron ore, 2,076,805 tons of foreign ore, 4,010,024 tons of mill cinder and roll scale, 903,514 tons of purchased scrap, 1,468,000 tons of home scrap and 1,967,000 tons of flue dust. An average of 1.870 tons of metalliferous minerals, exclusive of home scrap and flue dust, were consumed per ton of pig iron made in 1937, compared with 1.860 tons in 1936. Average consumption of ore per ton of pig iron made was 1.734 tons, against 1.714 tons in 1936.

Domestic production of ferroalloys in 1937 totaled 1,008,170 gross tons, an increase of 23 per cent over 1936. Shipments of ferroalloys amounted to 970,651 tons valued at $86,140,492, an increase of 14 per cent in quantity and 25 per cent in value over the previous year. Compared with the five-year average for 1925-29, which was 715,250 tons, the increase was 36 per cent.

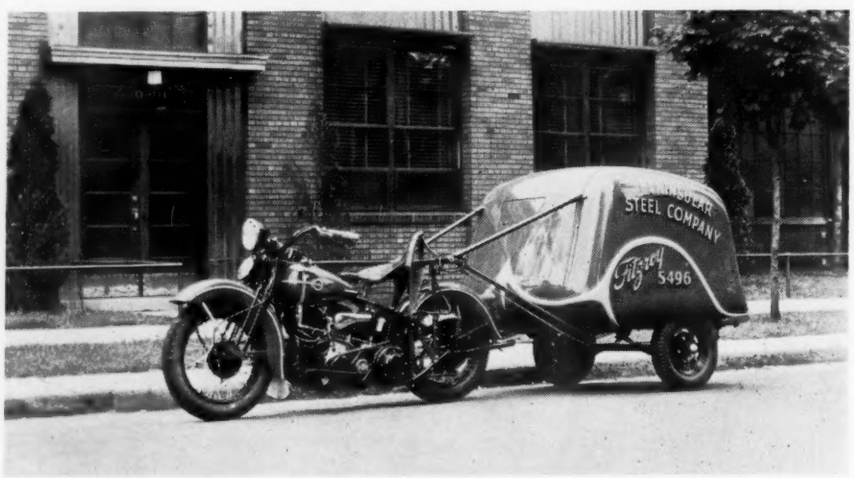
Actual Pig Iron Figures For June Little Changed

■ Complete figures tabulating coke pig iron production in the United States for June were little changed from the preliminary figures presented in STEEL, July 4, page 21.

Actual daily production in June averaged 35,538 gross tons, a loss of 5317, or 13.1 per cent, from the May rate of 40,675 tons. Total June output was 1,060,747 tons, against 1,260,937 tons in May, a reduction of 200,190 tons, or 15.9 per cent.

Blast furnaces in operation June 30 numbered 67, instead of the 65 previously reported. This compared with 73 on May 31. In addition to the stack changes tabulated last week, E. J. Lavino & Co. resumed operation at its Reusens stack in Virginia and Struthers Iron & Steel Co. placed its Anna stack in Ohio back in operation.

Motorcycle Trailer Speeds Steel Deliveries



■ **Delivery of small orders has frequently been associated with excessive costs. To reduce these costs and to speed deliveries, Peninsular Metal Products Co., Detroit, built this streamlined trailer almost entirely of steel. It provides 61 cubic feet of space and carries a 1000-pound load. Weighing only 390 pounds, it has brakes, lock, tail light, cantilever springs and tubular axle**

See Defects In Annual Wage

■ THAT an annual wage is not a cure for interruption or cessation of wage earners' income is the conclusion reached by Allen W. Rucker and N. W. Pickering, business economists, in a study published by Farrel-Birmingham Co. Inc., Ansonia, Conn.

"It is difficult to see that a *fiat* wage per annum differs economically from a *fiat* wage per hour or that a set sum for 60 minutes of work is any different from a set sum for 50 weeks of work," say the authors.

"The outcome of any *fiat* wage is the enforced unemployment of labor to the extent by which the wage exceeds its natural level. The natural level of aggregate annual factory payrolls, since 1921, has consistently been almost exactly that of gross farm income, as pointed out originally by these authors.

No Evidence

"There is no evidence to indicate that the industrial payroll in 1938 or 1939 will exceed the gross farm income any more than it has in the past. Current estimates suggest a factory payroll of not in excess of eight billion dollars for 1938.

"That sum will provide an average annual income of $800 for each of the approximately 10,000,000 persons available for employment in factories.

"As the present average annual wage is some $1100 for those employed, it will be seen that the total of eight billion dollars estimated for the payment of factory labor in 1938 will allow the employment of only 7,000,000 persons.

"If all 10,000,000 persons available for manufacturing are to be given jobs, then the present level of average annual wages must fall to $800. It is unlikely that union or political leadership will have the courage to propose an annual wage low enough to permit employment of the total labor supply in industry.

"The annual wage, if increased above current levels, will simply serve to diminish employment still further. It will thus have precisely the same shortcomings as the hourly or weekly wage determined by *fiat* at a point above the natural or economic level."

The authors conclude that: "An objective view of the plan suggests that, insofar as economic principle is concerned, the basic weakness of the annual wage lies exactly where the weakness of the hourly wage rate determined by *fiat* lies, namely:

"That the security and continuity of income for the same or larger number of employes can result only by removal of rigidities in production costs, not by increasing such rigidities or the field of their application. The annual wage proposal can be constructive only to the extent that it relieves rigidities in costs and prices; it will be futile to the degree to which it ignores these requirements."

FINANCIAL

MORE SHARES PROPOSED FOR SHEET & TUBE FINANCING

■ Youngstown Sheet & Tube Co. shareholders have been asked by directors to meet Aug. 30 to consider further steps in proposed financing. Last October the shareholders approved an increase in the authorized common shares from 2,000,000 to 2,500,000, and released the pre-emptive rights of common shareholders on not exceeding 400,000 shares. The plans were postponed owing to general business conditions.

Proposals to be considered Aug. 30 will, if approved, place the company in a position to go ahead when the board considers it advisable, with the number of common shares which may be converted set at 500,000 instead of 400,000. Close of July 16 is the record date for determination of shareholders entitled to vote.

WOODWARD PROFIT CUT BY SECOND QUARTER

A net profit of $260,961 for the first six months this year is reported by Woodward Iron Co., Birmingham, Ala. This is equal to 96 cents a share on common stock. For the second quarter a net loss of $26,429 was indicated, compared with a net profit of $287,390 in the first quarter.

Service Medals for 87 Tennessee Veterans

■ Eighty-seven employes of Tennessee Coal, Iron & Railroad Co. and affiliates in the Birmingham district were awarded service medals by United States Steel Corp. during the second quarter this year. Twelve were given 35-year medals, 30 received 30-year awards and 45 received 25-year recognition.

Among the more prominent employes receiving medals were C. E. Abbott, vice president in charge of raw materials; Dr. Groesbeck F. Walsh, assistant superintendent of the department of health; and John H. Bowen, secretary to the president.

Activities of Steel Users, Makers

■ SIMONDS Saw & Steel Co., Fitchburg, Mass., is planning to move into the new windowless plant which it built in 1931, but did not move into then due to the business depression. The new plant will contain the main Fitchburg saw and knife plant, the Fitchburg file and hack saw plant and also the Chicago plant. Moving and installation of machinery will take eight to 12 months. Simonds engineers are rushing final engineering plans so that these contracts can be let immediately.

♦

Hill Clutch Machine & Foundry Co., Cleveland, has removed its New York office formerly located at 44 Main street, Orange, N. J., to 90 West street. Arthur L. Whiteside will be in charge.

♦

Worthington Pump & Machinery Corp., Harrison, N. J., has booked an order for seven locomotive feedwater heaters for seven locomotives ordered by the Chilean Railroad of Chile, South America, from Baldwin Locomotive Co.

♦

Arrangements have been completed between Standard Machinery Co., Mystic, Conn., and F. J. Stokes Machine Co., Philadelphia, whereby the latter becomes sole sales agent for the complete line of Standard plastic molding presses.

♦

Federal Machine & Welder Co., Warren, O., has been licensed under patents of the Roth Welding Engineering Co., Detroit, to build the new Ultraspeed welding equipment developed by the Roth company for high-production spot welding operations.

♦

Anderson Engine & Foundry Co. plants, Anderson, Ind., were purchased recently by Michael Tauber & Co., Chicago, from Linfield Myers, receiver, for $61,000. Circuit court approved the purchasing bid and it has been announced the company will attempt to keep the factory operating temporarily.

♦

M. K. Mellott, until recently engaged in partnership with George H. Snyder in the firm of Mellott & Snyder, has purchased all other interest and ownership in the company, and it will be known and registered as M. K. Mellott & Co. The new firm assumes all contractual rights and obligations of Mellott & Snyder.

MEN OF INDUSTRY

■ PAUL MACKALL, vice president in charge of sales, Bethlehem Steel Co., Bethlehem, Pa., announces the following appointments in the sales organization:

K. L. Griffith, formerly manager of sales, sheet and strip division, has become assistant general manager of sales. D. C. Roscoe, formerly manager of sales, pipe and tubes division, has been named manager of sales, sheet and strip division, succeeding Mr. Griffith. A. T. Hunt will assist Mr. Roscoe as manager, galvanized sheets and formed sheet products.

E. A. Buxton, heretofore manager of sales, tool steel and small tools division, succeeds Mr. Roscoe as manager of pipe and tubes division, and D. A. St. Clair, of the tool steel and small tools division, has been named manager of sales of that division.

Mr. Griffith became associated with Bethlehem in 1932, at the time of the acquisition of Seneca Iron & Steel Co., of which he had been president and general manager. Mr. Roscoe has been with Bethlehem since his graduation from the University of Wisconsin in 1925. Mr. Hunt, who joined the company two years ago, previously was associated with the Eastern Rolling Mills, Baltimore, as manager of sales. Mr. Buxton became identified with Bethlehem upon his return from service in the World war, while Mr. St. Clair has been with the company since 1925.

♦

N. A. Holmer has been appointed general sales manager, Mid-States Steel & Wire Co., Crawfordsville, Ind.

♦

Jess A. Brewer, Atlanta, Ga., has been appointed southeastern representative for Chisholm-Moore Hoist Corp., Tonawanda, N. Y.

K. L. Griffith

♦

William W. Coleman, president, Bucyrus-Erie Co., South Milwaukee, Wis., has returned from Europe, where he spent considerable time with the firm's British affiliate.

♦

J. R. Adams, since 1920 foundry superintendent, Lebanon Steel Foundry, Lebanon, Pa., has been appointed general superintendent, Crucible Steel Castings Co., Lansdowne, Pa.

♦

Walter Harnischfeger, president, Harnischfeger Corp., Milwaukee, has returned from a European trip of several weeks. He attended the international road show in Holland and later visited Germany, France and England.

♦

David R. Lee, 2716 Tenth avenue, North, Seattle, has been named northwest representative of Edge Moor Iron Works Inc., Edge Moor, Del. A graduate of the naval academy, he spent 25 years in the navy, and more recently had been with Alan Porter Lee Inc., chemical engineers, New York.

♦

W. J. Mayer, formerly commercial research engineer for the Reading Iron Co., has been engaged by A. M. Byers Co., Pittsburgh, to act as a sales engineer. Mr. Mayer will work out of the company's Philadelphia division office, 1210 Girard Trust building, and his territory will include Baltimore and the South.

♦

F. M. Rich, formerly blast furnace superintendent, Buffalo works, Republic Steel Corp., is now conducting special investigations with the Steel Co. of Canada Ltd., Hamilton, Ont. This corrects the report in STEEL, June 27, page 20, that Mr. Rich became identified with the Steel Co. of Canada as blast furnace superintendent. J. F. Slee is superintendent of blast furnaces and coke works.

♦

George P. Wardley, recently appointed assistant director of industrial relations, Carnegie-Illinois Steel Corp., was tendered a testimonial banquet at Sherry hotel, Chicago, June 29. The banquet, attended by 200, was arranged by a committee representing South Works where Mr. Wardley formerly served as superintendent of industrial relations. B. M. Livezey, general superintendent, South Works, served as toastmaster.

♦

D. E. Sadler, assistant comptroller, Cleveland Cliffs Iron Co., Cleveland, has been appointed comptroller. J. P. Long has been named to the newly created position of acting auditor. H. C. Shade has been made general purchasing agent, with offices in the Union Commerce building, Cleveland. George W.

D. A. St. Clair

A. T. Hunt

D. C. Roscoe

E. A. Buxton

Jaedecke continues as purchasing agent of the mining department, with offices in Ishpeming, Mich.

♦

R. E. Taylor has been appointed sales research manager, Norton Co., Worcester, Mass. He succeeds Milton P. Higgins, who recently was made resident manager of the Norton electric furnace plant at Chippawa, Ont. Mr. Taylor has been associated with Norton about 17 years and for the past 12 years has been engaged in sales work in the Chicago district.

♦

A. L. Petersen has been appointed manager, St. Louis branch, Joseph T. Ryerson & Son Inc., Chicago. He has been with the Ryerson organization 25 years and has had wide experience in practically every department of the business, working successively in the billing, auditing, purchasing and sales departments at Chicago. After a period of World war service he returned to the

A. L. Petersen

Ryerson Detroit plant. Then followed a special assignment at the New York plant. Mr. Petersen for some time has been assistant manager at St. Louis.

R. B. Wilson will continue his association with Ryerson as special sales representative and will be responsible for certain important sales contacts in the St. Louis territory.

♦

Benjamin Schwartz, founder of the Institute of Scrap Iron and Steel ten years ago and its director general since then, has requested the institute board to release him from his contract as executive head. He will devote his time to law practice, industrial and public relations work.

Mr. Schwartz will be leaving the institute at its peak, with a new record enrollment of over 700 firms and 19 chapters. He received the first award made by the board to the individual who had done the most for the best interest of the industry.

In 1929 he drafted its first code of

Benjamin Schwartz

business practices, approved by the federal trade commission and still in effect. During NRA, he was the chairman of the industry's national code authority, as impartial chairman, he participated in more than 250 arbitrations of contractual disputes between members and nonmembers of the institute.

♦

W. L. Trumbauer has been appointed management's representative, Bethlehem plant, Bethlehem Steel Co., succeeding the late John K. Robinson. Mr. Trumbauer formerly was supervisor of training at the Bethlehem plant, and he has been succeeded in this latter position by S. W. Christine Jr., heretofore chief clerk of the training division.

E. P. Gillett, associated with the industrial relations work of the company since graduation from Ohio State university in 1935, has been appointed to Mr. Trumbauer's staff.

Mr. Trumbauer entered the employ of Bethlehem in 1910 as an apprentice die-sinker in the drop forge department. He advanced through various positions until in 1919 he was made general foreman of the Lehigh mill, heat treatment and cold finishing departments. In 1927 he was placed in charge of the metallurgical specification department and was supervisor of plant maintenance. In 1937 he became supervisor of training division, a post he held until his present appointment.

Mr. Christine joined Bethlehem in 1934. He had been an inspector in the Lehigh mills and was engaged in specification and steel application work before engaging in training work.

DIED:

■ GEORGE E. EMMONS, 80, a pioneer in the electrical industry, who was vice president in charge of manufacturing, General Electric Co., Schenectady, N. Y., from 1916 until his retirement in 1924, in Pasadena, Calif., July 1. In 1893, a year after Thomson-Houston Electric Co. was merged with Edison General Electric Co. to form General Electric Co., Mr. Emmons was named manager of the Lynn works. In 1894 he was transferred to Schenectady as assistant manager, and a year later became manager.

♦

Albert Lockwood, 48, works manager, Lumen Bearing Co., Buffalo, in that city, July 1.

♦

Charles J. Anderson, 63, president, Wood Working Machinery Co. of Buffalo Inc., in that city, June 27.

♦

Frederick A. Fuller, 79, retired, former Buffalo district sales manager of Union Drawn Steel Co., in Buffalo, June 27.

♦

Edward O. Goss, 72, president, Scovill Mfg. Co., Waterbury, Conn., in Waterbury, July 4. He had been associated with the company since 1887.

♦

Harry A. Duffy, 47, at one time purchasing agent for the Ford Motor Co. at the Highland Park plant, and recently purchasing agent for the Michigan Tool Co., Detroit, in that city, June 29.

♦

John F. Horn, 80, identified with the Homestead works of Carnegie-Illinois Steel Corp. for many years, and at one time affiliated with a subsidiary of the Apollo Steel Co., at Pittsburgh, July 5.

♦

Clifford M. Bean, 76, assistant to manager of sales at Boston for Lukens Steel Co., Coatesville, Pa., at his home in Somerville, Mass., July 3. Mr. Bean had been associated with Lukens 38 years.

♦

Willard H. Nash, 53, superintendent of blast furnaces, Wickwire Spencer Steel Co., Buffalo, in that city, July 5. He became associated with Wickwire in 1916 as construction engineer. Later he was made superintendent of wire mill and then superintendent of blast furnaces.

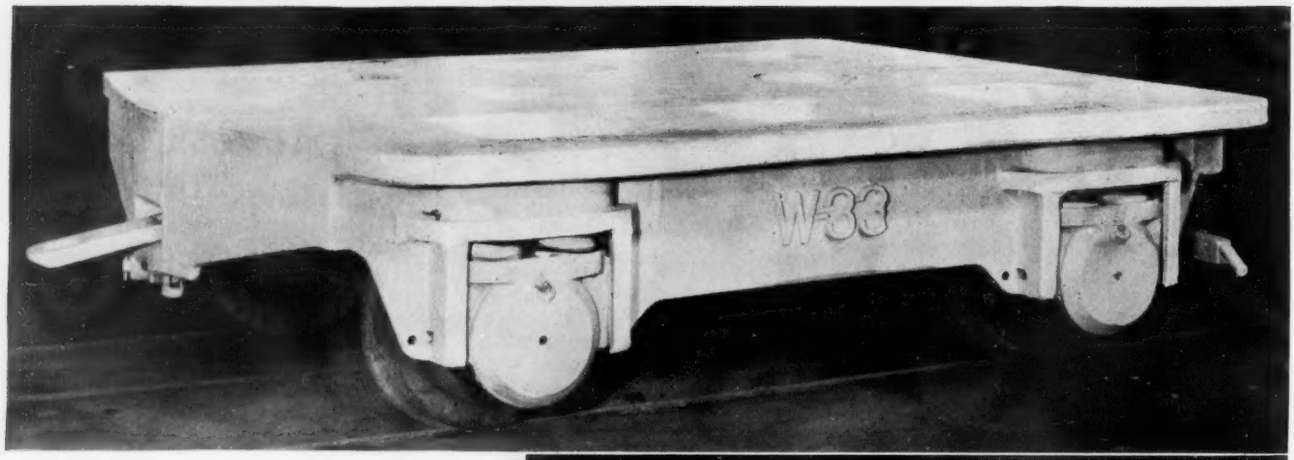
♦

Homer G. Balcom, 68, consulting engineer and authority on steel construction, July 3 in New York. Early in his career he was associated with the Berlin Iron Bridge Co. and the American Bridge Co. In 1928 he served on a committee of engineers which organized the American Institute of Steel Construction.

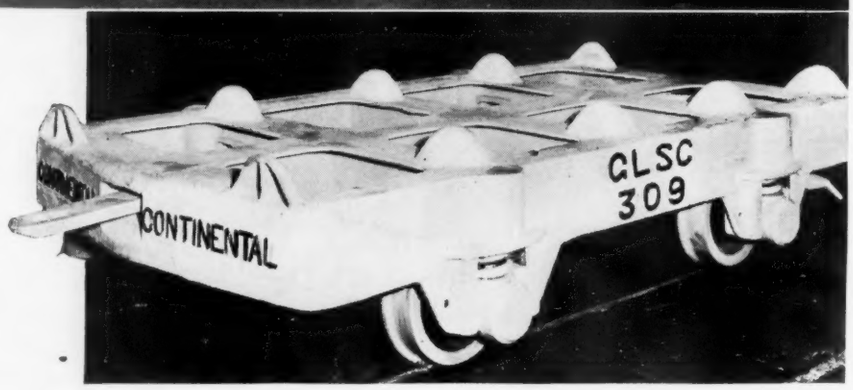
♦

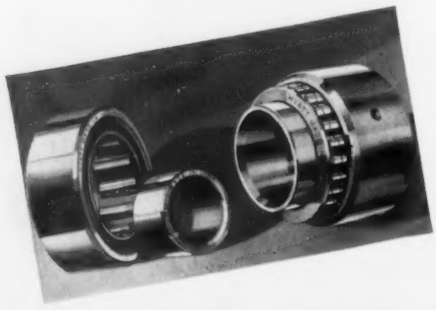
Clarence Rudel, 63, who until his retirement about a month ago was president of Canadian Vickers Ltd., Montreal, Que., in that city, June 21. A native of Cincinnati, he went to Montreal in 1902 as general manager of Canadian Fairbanks-Morse Co. He became head of the Vickers company in 1934.

THEY STAY *Right...* ON THE JOB!



These husky Ingot and Charging Box cars—equipped with Hyatt Roller Bearings—built by **CONTINENTAL ROLL & STEEL FOUNDRY COMPANY** are typical of thousands upon thousands of Hyattized cars successfully serving in steel mills everywhere.





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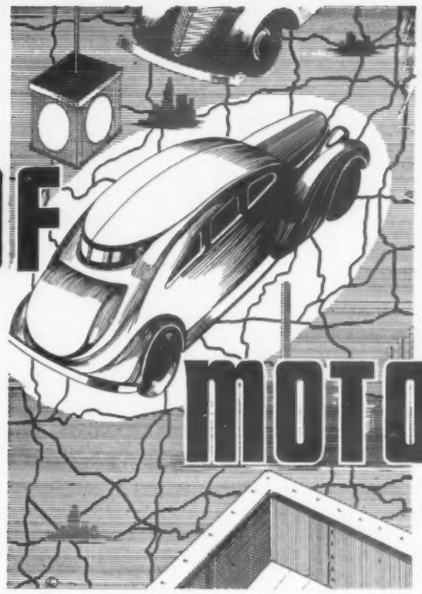
MIRRORS OF MOTORDOM



DETROIT

■ BEYOND a mild furore over attempts to clarify the steel price picture, the automotive industry is moving into the summer doldrums, with a combination of heat and vacations slowing activity perceptibly. A few fill-in releases on material and parts to balance out the tail-end of runs on 1938 models are coming in, but it will be several weeks before any volume develops for new model specifications, only Buick and Packard having done much on this score as yet.

With a firm floor now established under steel prices, it is going to be difficult to do any rapid-fire pencil work and come out with figures below the new market. On this score alone, steel sellers are inclined to exhibit a hopeful attitude toward the lower prices.

Action was taken here last week to realign cold-rolled strip prices. Regular cold-rolled strip is now offered at 2.95c, Cleveland base, plus the 10 cents arbitrary freight charge into Detroit, making the delivered price 3.05c here, and 3.10c in eastern Michigan.

The commodity cold-rolled strip, comprising most of the business in this product, is now sold at the same price as mill-run cold-rolled sheets—3.10c, Cleveland base, plus the 10-cent arbitrary, or a delivered price of 3.20c into Detroit. These two products cover a range of sizes up to 12 inches in width; anything over that takes the sheet price.

Buy Mill-Run Sheets

The Detroit delivered price on full prime cold-rolled sheets is 3.30c, but it is pointed out that nearly all consumers buy mill-run sheets in this classification, which are quoted at $2 per ton less, or a Detroit delivered price of 3.20c.

It takes almost a super mathematician to keep in touch with all the price changes which have been popping in with machine-gun rapidity and to relate them to delivered prices and arrive at some semblance of what steel costs are now going to be. Steel company sales offices here are working late nights to correct their price cards, some steel buyers are placing tonnage with price subject to later determination.

There is bound to be some reshuffling of steel accounts, although this may take a little time to effect. As one steel salesman put it, "All we are selling now is freight rates." The obvious effect should be to centralize a mill's customers to a nearby territory, but it is problematical whether any steel company will relinquish automobile tonnage, no matter how much freight has to be absorbed.

As soon as steel prices were reduced, automobile companies immediately got in touch with parts sup-

BY A. H. ALLEN
Detroit Editor, STEEL

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Welding Chevrolet Gasoline Tanks Automatically

■ **Welding the seams in the two halves of Chevrolet gasoline tanks is accomplished in the automatic welding machine shown in the left foreground. Tanks are inspected on the rack in the background, and the two halves assembled preparatory to welding by the third operator**

pliers to determine how much material they would have to take at the higher price, and how much the price reductions would affect parts costs. In this connection, there is usually a "breaking point" to be ascertained—in other words the supplier will relay the information to the customer such as "we have steel inventory to supply 50,000 more pieces; the balance of 25,000 pieces will take the lower price on steel, and piece cost will be cut accordingly 2½ cents each."

The new steel prices undoubtedly will exert a major effect on parts companies. Where formerly a supplier, because of favorable location with respect to steel, was able to get parts business at a price which local competition could not touch, now this competitive advantage may be removed by the equalization of steel basing points, and the close-to-the-line operator forced either to locate his plant nearer to the consumer or to relinquish the business to other suppliers not faced with absorbing high freight costs.

■ MANUFACTURE of subassemblies has been the first to feel the effect of the annual changeover to new models. This week subassembly lines in many plants were halted. Cadillac built the final 1938 engines about 10 days ago. Ford subassembly lines were idle all last week, although scheduled to resume this week. Branch assembly plants, too, were idle last week as an extension of the Monday holiday, so that production for the industry suffered appreciably. It is understood Ford again will close later in the month for two to three weeks.

Chevrolet foundry, transmission and steering gear plants in Saginaw operated four days last week, with inventory shutdowns for two weeks scheduled after the current week. The malleable iron plant, closed for the past four weeks, is scheduled to reopen July 18.

Graham is drawing up plans to schedule another 500 cars, but many difficulties beset the path, principally from a financial standpoint. However, inquiries have been issued on parts and, pending action by the committee now supervising buying and scheduling, a fresh start will be made on assemblies.

Hudson, Studebaker and Packard all are expected to close some time this month, as well as the Chrysler divisions. Subassembly work on new models should be started shortly. Plant maintenance force at the Dodge main plant has been working full weeks in connection with rearranging present equipment and installing new facilities for 1939 models.

■ SPEAKING of maintenance, unusual precautions are taken in automobile plants to avoid fire hazards. At Pontiac, for example, no accumulation of dried duco finishing material is permitted; all spray booths are cleaned thoroughly every day with a soap solution and then steamed. Brushes and copper scrapers are used, but no iron scrapers because of the danger of sparks.

Both manual and automatic alarms are maintained. Enameling ovens are protected with complete automatic equipment which detects the first sign of a fire, turns in an alarm, opens valves from chemical foam extinguishers, opens another valve which permits passage of enamel into a fire safety tank, shuts off power and shuts off all heaters and ventilators.

Another innovation credited to the maintenance department in the Pontiac plant is the use of double electric cables throughout the buildings; one is for power and one for light, but they are of sufficient capacity that either one can handle the combined power and light load.

■ MACHINE tool and equipment interests in this district are already consulting with automobile companies on requirements for 1940 models. It is a little unusual for this work to be started so early, although of course it is always handled well in advance so no delays are encountered in the designing, building and installing of special machines.

From present indications, the 1940 models will embody a number of mechanical changes, chief of which will be centered in transmissions. Other changes are of a nature to reduce costs by more efficient mechanization of production. Engines probably will not be tried with rear mountings until 1941 or possibly later.

Sharp improvement in security prices apparently has engendered enough confidence to be reflected in retail sales of automobiles. Naturally this would be noticed first in the so-called "class" cars, and Packard and Cadillac report appreciable improvement in sales of their larger models in June. A strong market should continue to coax frightened capital out of hiding, with consequent benefit to both retail sales and new industrial financing.

Recent article in a popular weekly purporting to show the connection between certain individuals and groups in the UAW and the communist party checks up with the steps taken by Homer Martin, UAW president, in dismissing five officials of the union because of communist connections. It also confirms reports published here as far back as March, 1937, indicating some sort of behind-the-scenes tieup between certain CIO leaders and the communist party.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,744
Feb.	300,810	383,900	202,872
March	438,943	519,022	238,753
April	527,625	553,231	238,133
May	480,518	540,377	210,183
5 mos.	2,125,140	2,395,716	1,116,663
June	469,368	521,153	*175,000
July	451,206	456,909	
Aug.	275,934	405,072	
Sept.	139,820	175,630	
Oct.	230,049	337,979	
Nov.	405,799	376,629	
Dec.	518,958	346,886	
Year	4,616,274	5,015,974	

*Estimated.

Week ended

June 11	40,175
June 18	41,790
June 25	40,918
July 2	40,945

(Production figures for the week ended July 9 will be found on page 19.)

Forecast Steel House as "Factory-Built Package"

■ Speaking before the American Society of Agicultural Engineers June 29 at Pacific Grove, Calif., Ray Crow, sales promotion engineer of the Tennessee Coal, Iron & Railroad Co., United States Steel Corp., subsidiary said most authorities are agreed the low cost house of the future will be a factory-built package unit complete in all details.

In supporting this contention he said a report issued by the federal commission to investigate economic waste held the conventional system of residential building construction showed a waste of 53 per cent.

"It is evident," he added, "that in the elimination or partial elimination of this item lies an opportunity for the profitable application of factory methods whereby costs of construction can be radically reduced. However, it will take years of intensive effort to overcome the serious handicaps now involved in developing a type of building that the public will buy."

Mr. Crow said that such a structure must be developed by a process of evolution and finally it may bear no closer resemblance to the conventional house of today than does the modern motor car to the horse-drawn phaeton of 30 years ago. He visualized the prefabricated home of the future with walls, floors, and all fixtures stamped or molded as an integral unit from a material possibly not yet developed, in a single factory operation.

WINDOWS OF WASHINGTON

BY L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ IN SPITE of the fact that the newly organized national economics commission, which is charged with going into the monopoly situation, has had only a couple of meetings, a difference of opinion has already arisen as to how the investigations shall be made.

Several members believe the large amount of data already on hand in the various government departments should be used, while other members think this information should be used as a ground work to be supplemented by public hearings. At any rate, while the matter has not yet been thrashed out, it is practically certain, unless the whole present idea of the commission is upset, public hearings will not be held until September or later.

Procedure Not Decided

Six federal agencies are represented on the commission, the federal trade commission, securities and exchange commission, department of justice, treasury department, department of commerce and labor department. It will also be recalled that there are six congressional members on the commission, three from the senate and three from the house, and under the plan which has so far been worked out, one member of congress will act with each of the government units.

Commission members have denied up to this time that these units of two, namely one member of congress and one government agent, yet to be designated, will be subcommittees in the strictest sense of the word, but it has been indicated by the commission that these units may later be empowered to sit as committee units. It was explained that the object of this would be to have one member of congress and one executive officer entirely familiar with each phase of the various problems.

As stated last week, the various government agencies represented on the new commission each have a vast amount of material dealing with the anti-trust situation coming under their respective jurisdiction. At a recent meeting of the commission the departmental representative told the group that the actual assembling of the existing data, which they have on hand, will take anywhere from three weeks to a month.

In connection with the work of the various government departments, it has been indicated that the justice department will present accumulated anti-trust matter, the federal trade commission will assemble the Clayton act and unfair trade practice material and the labor department, data on wages and price relationships. Information of corporate income and taxation will be supplied by the treasury, and the commerce department and securities and exchange commission will present supplementary facts in their fields.

LABOR DEPARTMENT SETS UP WAGE-HOUR DIVISION

The new wage-hour law will not become effective until Oct. 24, which will be 120 days after it was signed by the President, yet industry generally is showing great interest in the whys and wherefores of the new set-up in the department of labor.

A great deal of spade work has already been done in contemplation of the organization of the hours and wages division in the labor department. While the law itself, invoking a minimum of 25 cents an hour, will not be effective until October, there is nothing to prevent the government from setting up the new organization and having it in good running order by that time.

Labor department economists have already begun a study of certain industries to pave the way for application of the new law. The bureau of labor statistics and other divisions of the department will conduct preliminary studies, one aim of which will be to determine what constitutes a seasonable industry. An appropriation of $400,000 was made in the deficiency bill for this new division which passed during the closing hours of the last session of congress. The labor department officials had asked for a half million dollars but their request was cut down 20 per cent by the congressional committee.

Not only is the department of labor doing preliminary work in connection with the new law, but there are evident signs of action at headquarters of the A. F. of L. and C. I. O. In addition to labor, offices of many manufacturing trade associations have also started to look into the situation.

While during the flourishing days of the NRA more than 5000 persons were on its payrolls, it is not believed that more than 150 will be connected with this new division. The report is that all employes in the new division are to be taken from civil service rolls.

Reilly Is Legal Advisor

While no provision has yet been made for housing the hours and wages division, it is believed it will be located in the department of labor building on Constitution Avenue. However, in order to do this, some other division of the department must be moved out, as the labor department has expanded materially during the past two or three years that it has been located in its new building.

G. D. Reilly, solicitor of the labor

department, is already making an effort to interpret the various provisions of the new act. There seems to be little doubt but he will some day be called upon to justify the constitutionality of the new law.

A. F. OF L. SEES SIGNS OF DEPRESSION NEARING END

The A. F. of L., in surveying the business situation, last week expressed the belief that better business prospects "may mark the bottom of the present recession." The federation admits it is too early to tell, but in any case business observers believe that the business decline "is nearing its end and that we may look forward to mild improvement by fall."

The federation calls attention to the fact that the business decline of 1937-38 has reduced industrial activity more rapidly than any other such decline in our history It states that "in the first half of 1938 productive activity was cut to 1934 levels and the country's mines and factories turned out 34 per cent less production than last year."

Attention is called by the federation to the fact that because of the low level of production "industrial companies have had very much higher overhead charges per unit of their output and this has greatly reduced their profits."

Discussing the outlook, the federation says that "a number of industrial reports have recently brightened the business outlook. Automobile sales in June were larger than expected and the volume of orders on hand will modify plans for summer closing of plants; the industry had under-estimated the effect of maintained consumer buying power. Steel production has increased for three consecutive weeks and the steel industry believes that inventories in the hands of its customers are largely exhausted and an increasing volume of orders may be expected."

Many Obstacles Ahead

In continuing its prediction for the future, the federation says further that "although these factors brighten the outlook it is too early to tell whether they mark a temporary or more permanent improvement. The railroads are still in serious difficulties with possible receiverships looming for a few roads; the down trend of prices is not yet clearly checked; steel and the heavy industries are still at very low levels, many operating in the red; there is still some talk of wage cuts; although the supply of bank credit is liberal and rates low, business has not yet started to borrow; there are still 11,400,000 unemployed and workers' buying power is not yet increasing. The situation is still critical and it will probably be some time before the government spending program lifts industry to definitely higher levels. Union resistance to wage cuts is especially important; union insistence on wage increases wherever industry can pay them is equally vital. This is a time for union cooperation to save costs."

STEEL BUYING FOR PUBLIC WORKS BEING HASTENED

Purchase of 32,945 tons of steel before Aug. 15 is planned by the bureau of reclamation, Commissioner John C. Page stated last week.

The bureau is pushing orders for steel and machinery manufactured of steel needed in connection with its construction program to take advantage of the new lowered prices and also to spread quickly into the industrial cities benefits represented by off-the-site work.

In addition to the steel orders, it is estimated that 500 tons of copper wire and other copper products also will be ordered before Aug. 15.

Included in the orders anticipated between now and Aug. 15 are 13,550 tons of reinforcing steel, 9430 tons of structural steel, 5000 tons of rails and accessories, 1915 tons of gates, valves and hoists, 5050 tons of pipe and penstocks, and 1000 tons of turbines.

HULL CLAIMS TRADE AGREEMENTS HELP STEEL

Secretary of State Hull has sent a communication to Representative Ramsay, West Virginia, upholding trade agreements made by the state department and refuting what the secretary calls "erroneous statements and criticisms that have appeared for some time past in certain newspapers in and about Wheeling, W. Va."

During the course of his discussion Secretary Hull said that "the few concessions granted in trade agreements on iron and steel products are represented as responsible for the low per cent of capacity at which that industry has been operating, but the writer of the articles chooses to ignore the fact that imports of iron and steel products last year amounted to less than 10 per cent of exports."

Discussing further the iron and steel situation as regards trade agreements in his communication to Mr. Ramsay, Secretary Hull said "in 1934, the year in which the trade-agreements program was initiated, the iron and steel industry operated at an average of 37.4 per cent of capacity. In 1935 activity had increased to 48.7 per cent, in 1936 to 68.4 per cent, and in 1937 to 72.5 per cent. For the first nine months of 1937, in fact, the average was considerably higher than this.

"Since practically all of the few concessions which have been granted by the United States on iron and steel products were granted in the trade agreements with Belgium and Sweden, both of which came into force in 1935, these figures do not appear to substantiate the charge that the program has been detrimental to the industry.

"During the first four months of 1938 the industry was operating at a considerably reduced percentage of capacity, but during this period exports were being maintained even above the high level of 1937. Thus exports have provided stability and security to workers in the industry during the difficult period. Had the writer of the articles in question taken this into account, he might have been less quick to criticize the program by which the government is endeavoring to protect and expand our export markets."

ICKES SAYS MORE PRICE REDUCTIONS ARE NEEDED

Secretary of Interior Ickes, in a radio address last week, said that the steel industry's action in reducing prices "if followed in other lines of business, as it should be, will be of material aid in the President's program to help business and reduce unemployment." He said further that "a reduction in the price of steel or other building materials will mean that the same sum of money can buy more of these materials, thus creating more work."

Speaking as PWA administrator, the secretary called on manufacturers of all building materials to follow the steel industry in reducing prices and called attention of local communities that they must submit applications within the next 69 working days if they want to share in PWA's $1,500,000,000 recovery program.

Secretary Ickes stated that he had found contractors willing to co-operate but he said that "genuine co-operation with the government for the benefit of business and industry leaves no field for collusive bidding, for unfair hiking of prices, for the paying of graft to corrupt officials, or for requiring workmen to kick back part of their wages."

INTERSTATE NOT A UTILITY

The securities and exchange commission has issued an order that the Interlake Iron Corp., of Chicago, Duluth and Toledo, is declared "not to be an electric utility company."

The Interlake Iron Corp., manufacturer of merchant pig iron, commercial coke and by-products, applied to the commissioin for a declaration of its status under the public utility holding company act of 1935. Following a hearing in June, the commission last week held that the corporation is not subject to the act.

Have Steel's Critics Won Victory?

■ BY ELIMINATING the Pittsburgh-plus pricing system the steel industry appears to have gone far toward silencing some of its critics.

In reducing prices, the industry must have pleased government and public spokesmen who declared steel prices were "too high."

In establishing f.o.b. mill prices it probably pleased the federal trade commission, numerous college professors and other laymen who have attacked Pittsburgh-plus these many years.

In timing the price cuts with a slight rise in activity and a marked improvement in sentiment, it should have pleased those economists who have declared that lower prices would promote demand.

In lowering prices without thus far touching wage rates the industry should have won the President's approbation.

Also, the entire procedure should place the industry in a more favorable position to meet the approaching anti-monopoly investigation.

Confusion Arises from New Hardships

Against these dubious assets are serious, tangible liabilities. Foremost is the confusion arising from sudden and drastic change.

Consumer-producer alignments which have built up through orderly experience over many years are disarranged or destroyed overnight. Consumers and producers adversely affected by the changes must adjust themselves to the newly imposed hardships at a time when profits are low or entirely absent.

Outstanding fact is that the new f.o.b. mill system favors those steel companies that have widest distribution of mills. Conversely, it works hardships on many smaller producers not so favored.

Under rigid maintenance of the new mill prices many consumers with plants at a distance from basing points will find themselves at a serious disadvantage as compared with those located at or near basing points.

The above facts create a condition in which big industry is favored as never before.

Never has there been a time when conditions favored steel company mergers as much as now.

Never has there been so great a necessity on the part of steel companies to be able to depend on the constancy of their outlets. Never has there been so great a need to acquire consumer outlets or go into competition with customers.

New System Favors "Big Business"

The government frowns on mergers. It denounces "bigness" as "badness." Yet the government's demands, now acceded to by the steel industry, emphasizes "bigness" as essential to prosperity.

The government frowns on dislocations which cause unemployment or which lead to disturbing shifts in employment. Yet the government's demands, now acceded to by the steel industry, increase the tendencies in those directions.

Time alone will reveal the far-reaching effects of the recent changes. In the meantime many well-posted consumers and producers will continue to believe that the problems of developing an ideal pricing system can be solved best by the orderly process of evolution and refinement rather than by the uprooting method advocated by outside theorists.

Today the critics believe that they have won their points. A year or two years hence will be soon enough to appraise the good or evil of their victory.

Rate of Improvement in Business Still Moderate

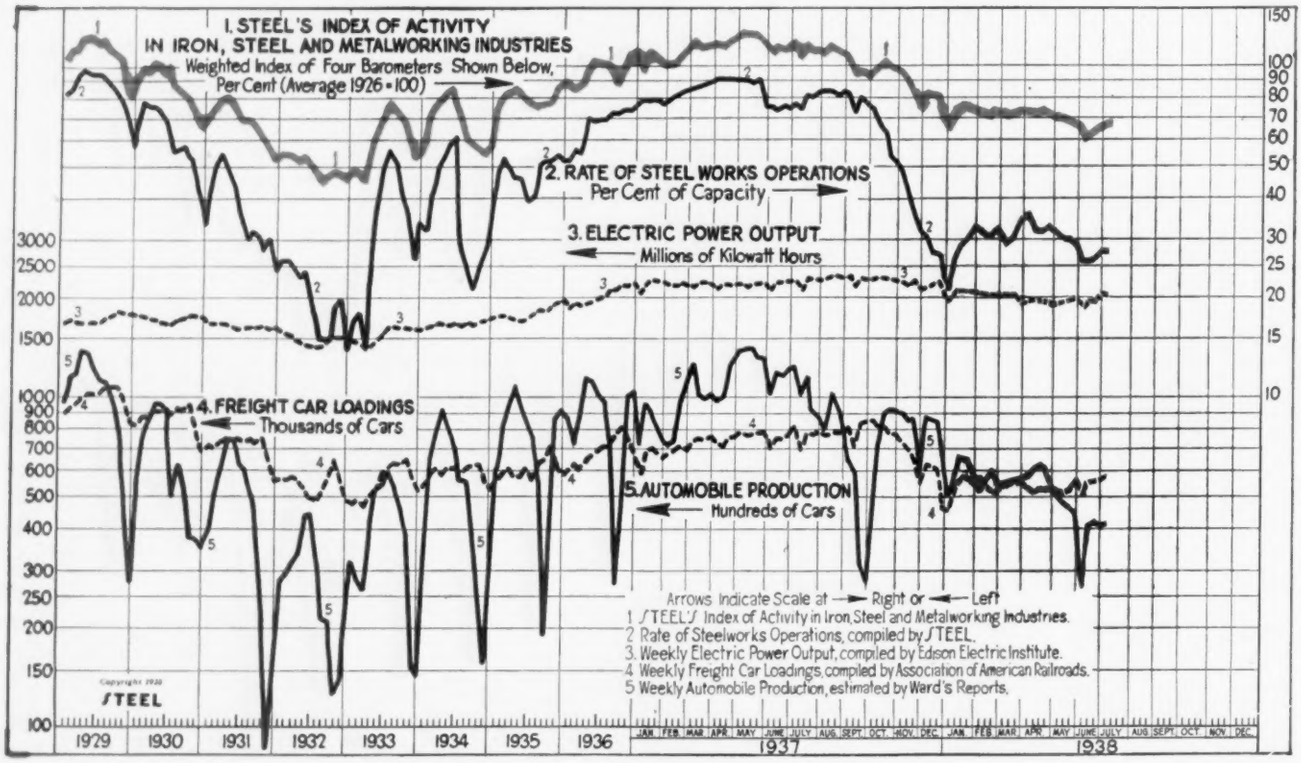
■ IN SPITE of adverse seasonal obstacles, industrial activity gained moderately in the week ended July 2. STEEL'S index of activity in the iron, steel and metalworking industries for that seven-day period stood at 66.3 per cent, a modest gain from 66.0 per cent in the preceding week. However, the index still remains below the level just prior to Memorial day.

Steelmaking operations remained unchanged at 28.0 per cent in the week ended July 2. This represents a gain of 2.5 points from the recent low of 25.5 per cent recorded in the week ended June 4. However, a substantial reduction in the steel rate is predicted for the week ended July 9, due to holiday shut-downs.

Electric power consumption declined slightly in the week ended July 2, but remained well above the 2,000,000,000 kilowatt-hour level. Automobile production varied only 27 units in the same week to register a slight gain to 40,945 units. Automobile assemblies for the week ended July 9 will probably show a sharp reduction due to a prolonged holiday interruption.

Early estimates of revenue freight carloadings for the week ended July 2 raised the total for the week to 580,000 cars, an increase of approximately 22,000 over the preceding week. This makes the seventh weekly gain recorded in the past eight weeks. However, it represents a decrease of approximately 226,000 cars from the total of the corresponding week last year.

A sharp decline in STEEL'S index is anticipated for the week ended July 9, due primarily to holiday interruptions.


1. STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
Weighted Index of Four Barometers Shown Below,
Per Cent (Average 1926 • 100)
2. RATE OF STEEL WORKS OPERATIONS
Per Cent of Capacity
3. ELECTRIC POWER OUTPUT
Millions of Kilowatt Hours
4. FREIGHT CAR LOADINGS
Thousands of Cars
5. AUTOMOBILE PRODUCTION
Hundreds of Cars
Arrows Indicate Scale at → Right or ← Left
1 STEEL'S Index of Activity in Iron, Steel and Metalworking Industries.
2 Rate of Steelworks Operations, compiled by STEEL.
3 Weekly Electric Power Output, compiled by Edison Electric Institute.
4 Weekly Freight Car Loadings, compiled by Association of American Railroads.
5 Weekly Automobile Production, estimated by Ward's Reports.
STEEL
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938

STEEL'S index of activity gained 0.3 points to 66.3 per cent in the week ended July 2:

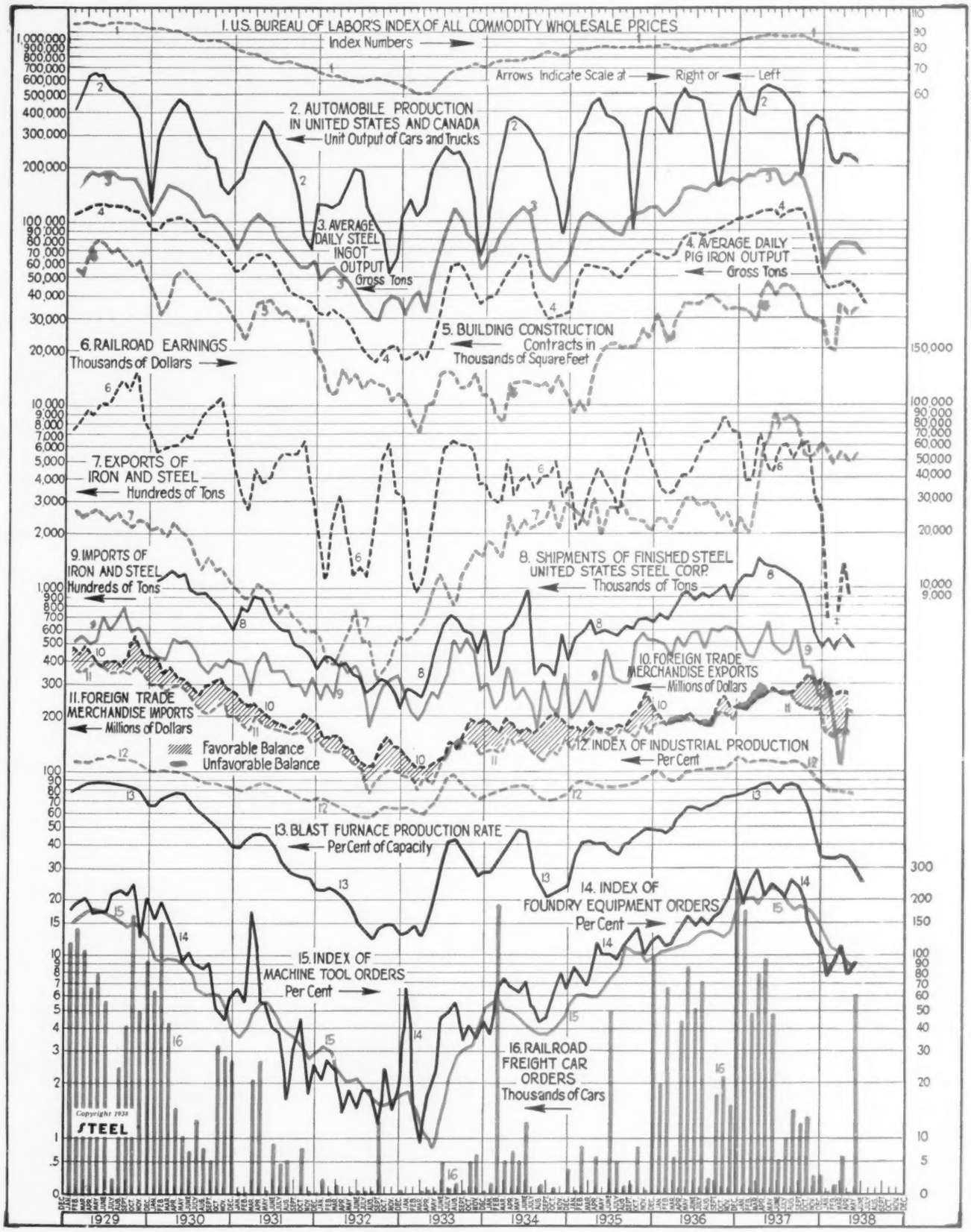
Week ending	STEEL'S Index of Activity Index No. 1938	1937	Steelworks Operating Rate Per Cent 1938	1937	Electric Power Output Million KWH 1938	1937	Freight Car Loadings 1938	1937	Weekly Auto Output 1938	1937
Apr. 2	72.0	112.0	36.0	91.5	1,978	2,146	523,489	726,687	57,500	97,005
Apr. 9	71.3	112.8	32.0	91.5	1,990	2,176	521,978	716,044	60,975	99,196
Apr. 16	71.4	119.6	32.0	91.5	1,957	2,173	537,595	751,328	62,021	125,472
Apr. 23	70.8	122.0	32.5	91.5	1,951	2,188	523,767	761,182	60,563	133,164
Apr. 30	68.4	123.9	32.0	91.0	1,938	2,193	543,075	782,423	50,755	139,475
May 7	68.5	123.5	31.0	91.0	1,939	2,176	536,140	767,481	53,385	140,188
May 14	67.2	123.2	30.0	89.0	1,967	2,194	541,813	773,669	47,415	140,396
May 21	67.1	122.2	30.0	91.5	1,967	2,198	545,808	779,276	46,810	131,306
May 28	66.5	115.6	28.5	75.0	1,973	2,206	562,061	794,855	45,120	131,421
June 4	58.1	105.1	25.5	75.0	1,878	2,131	502,624	692,140	26,980	101,629
June 11	64.4	111.4	25.5	74.0	1,991	2,214	553,854	754,360	40,175	118,798
June 18	65.2	110.3	27.0	75.5	1,991	2,213	555,569	756,289	41,790	111,620
June 25	66.0	112.8	28.0	74.0	2,019	2,238	558,937†	773,733	40,918	121,032
July 2	66.3*	115.3	28.0	77.5	2,014	2,238	580,000*	806,168	40,945	122,890

*Preliminary. †Revised.

TREND

Key:	May, 1938	Key:	May, 1938	Key:	May, 1938	Key:	May, 1938
1	78.0	5	34,760,000	9	20,814	13	25.4†
2	210,183	6	‡9,236,818*	10	274,482,000*	14	90.6
3	63,010†	7	540,639	11	158,907,000*	15	88.0
4	35,186†	8	465,081	12	76.0	16	6,014

*April. †June. ‡Deficit of $2,136,481 in February not shown on chart.



Key: 1. U. S. Bureau of Labor's Index of all Commodity Wholesale Prices. 2. Automobile Production in United States and Canada, compiled by U. S. Department of Commerce. 3. Average Daily Steel Ingot Output, compiled by American Iron and Steel Institute. 4. Average Daily Pig Iron Output, compiled by STEEL. 5. Building Construction, Contract Awards in 37 States, compiled by F. W. Dodge Corp. 6. Railroad Earnings, Net Operating Income for Class I Roads, compiled by Bureau of Railroad Economics. 7 and 9. Iron and Steel Foreign Trade, reported by Bureau of Foreign and Domestic Commerce. 8. Shipments of Finished Steel, United States Steel Corp. 10 and 11. Foreign Trade, Value of Exports and Imports, reported by Bureau of Foreign and Domestic Commerce. 12. Index of Industrial Production (adjusted for seasonal variation: average 1923-25=100) computed by Federal Reserve Board. 13. Blast Furnace Production Rate, compiled by STEEL. 14. Index of Foundry Equipment Orders (Average 1922-24=100), compiled by American Foundry Equipment association. 15. Index of Machine Tool Orders (Three-month moving average; average monthly shipments 1926=100), compiled by National Machine Tool Builders association. 16. Railroad Freight Car Orders, compiled by STEEL.

Motion Analysis

Increasing efficiency of hand operations in manufacturing affords opportunities for considerable savings in many plants. Motion analysis is now highly developed

By K. D. CONN
Staff Engineer
A. B. Segur & Co.
Oak Park, Ill.

Motion-time-analysis is based on the fundamental laws of motion which state that each of the 17 basic motions require a definite time which has been established by research and tabulated. Determining by analysis what fundamental motions are necessary, and what may be eliminated or shortened by use of fixtures or more convenient arrangement, the entire sequence of necessary motions may be scheduled and timed before starting work

■ HUNDREDS of years ago in central Europe mechanical geniuses were constructing long bridges at which engineers of today marvel. Today young engineers with tables and slide rule can make plans for a safe and longer bridge that can be constructed in a fraction of the time.

What makes possible such a feat? Proper tools in the form of tables. Ordinary planning and bridge construction have become a routine of calculation from tables of allowed stresses.

Only Means

For years, mechanical ingenuity in manufacturing has been the only means of setting up operations or for improving original setup. Labor costs, frequently meaning success or ruin, depended upon the manufacturer's own mechanical ability or upon that of the people he employed. Many manufacturers found that mechanics of the necessary caliber were hard to secure and, once secured, hard to hold.

Such a basis for setting up and improving operations is today out of date, just as the trial and error method of bridge building. Motion study has become an accepted tool for such work. With motion study, operations are set up in advance according to the best motion path and with exact time values. Improvements in present methods are the result of application of very definite motion improvement principles.

Fig. 1—Old method involved holding shutter blades between the knees

Determines Method

Under motion-time-analysis the degree of repetition of the operation determines how the motion study shall be made. On highly repetitive work, a detailed written analysis is recorded, a study of which then indicates improvements that should be effected. On job-shop performance the analyses are made by types of work, and improvements are developed which apply to all operations in a certain class.

Among examples of typical improvements and savings are the following taken from applications at Pines Winterfront Co., Chicago, manufacturer of winterfronts for cars, trucks and tractors:

In shutter winterfronts, individual shutter blades are common to all

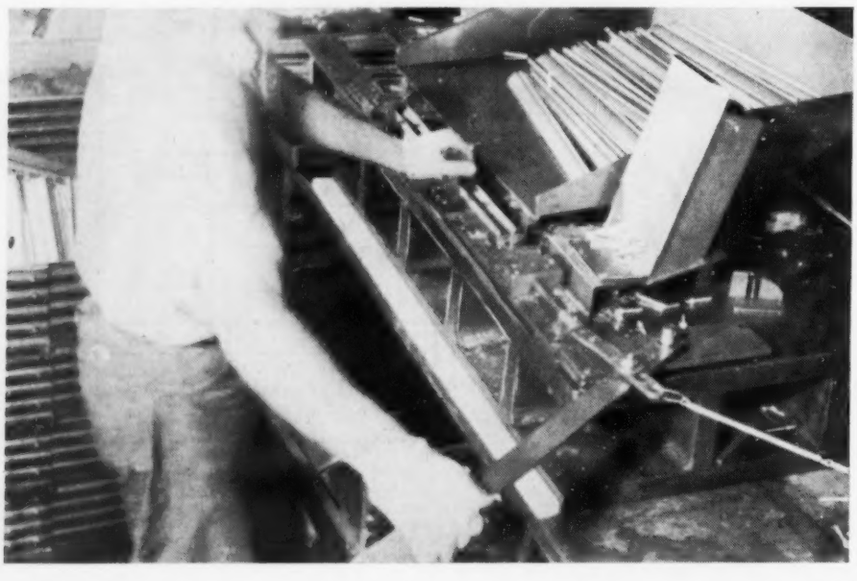


Fig. 2—New method uses clamp to drive four pins simultaneously. Parts supply is improved also

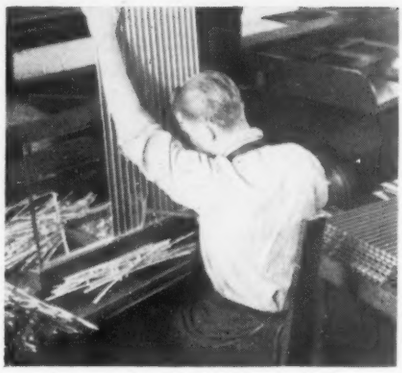


Fig. 3—Formerly, after placing operating bar over rivets, blades were held by left hand while riveting

types of fronts regardless of whether a manual or a thermostatic control is used. Small pins in end of each blade hold the blades in the frame.

These pins were formerly driven by hand into their respective holes, as shown in Fig. 1. Two blades were picked up with the left hand and placed between operator's knees with one end of blades resting on a steel block. In this vertical position, operator picked up two pins with left hand and drove them, one at a time, into proper holes with a hammer held in the right hand. Blades then were turned end-for-end, two more pins driven in, and blades placed with the left hand into a container to operator's left.

Simple Fixture

New method employs a simple fixture, Fig. 2, consisting of a holder for shutter blades and pins, and a lever to force the four pins into their holes at a single operation. Improved containers also were designed to facilitate grasping pins and shutter blades.

After releasing lever, with spring attached to return it to position, operator picks up two assembled pins and shutter blades out of fixture with right hand. While these blades are disposed into a container under the bench, two pins are picked up in left hand from left-side pin container and placed in left guide slots. Two blank shutter blades then are secured with left hand and two more pins taken with the right hand from the right-side pin container. After blank blades and pins for right guide slots are placed in fixture, the right hand secures and pulls the lever which forces pins into holes in shutter blades.

Time for the old method was 0.11250 minute per shutter blade. New method requires 0.05070 minute. In other words, the new method is about 2¼ times as fast as the old method.

Another improved assembly operation illustrates how certain characteristics of the material being handled affect the job and its improvement. This operation is an assembling and riveting job in which rivets are placed in holes in a steel block and a plated operating bar placed over the rivets. Shutter blades then are placed on operating bar over each rivet, and the whole is riveted together by hammering each rivet.

Operating bars usually come to assembly operation warped or bent from previous machining operations. This bar therefore, must be straightened by hand. After being placed over rivets, it must be held down while placing shutter blades on it in preparation for riveting. Fig. 3 indicates how work was assembled and riveted.

Final shutter blade to be assembled is different in design from remainder, so in new method a separate container for these blades is placed on right side of working space. Container for regular blades

Fig. 4—Now a foot-operated clamp holds operating bar over rivets and a notched top support for blades leaves both hands free

is placed to left of operator. Fig. 4 shows setup for new method.

Foot-operated clamp, shown in Fig. 5, is used to hold operating bar down securely against rivets. This picture also shows the container designed to facilitate grasping rivets, some of which are in place under the operating bar, which is shown in position before clamping. Another improvement in the new setup is the notches, Fig. 6, in top bar of frame in which shutter blades are placed for riveting to assist the operator in placing and holding blades in their proper position.

New method is set up so a special punch and hammer may be used to speed up riveting. Even with the same method of riveting and with the old hammer, time for assembly by old and new methods was 1.34430 minutes and 0.75680 minute, respectively. This represents a saving of 43 per cent.

Third operation which is to be cited here illustrates how improvements often increase the productiveness of a machine. The operation consists of spot welding a frame of four pieces together. By the old method four pieces to be welded were fitted into frame-type fixture, shown in Fig. 7. Operator held this fixture in his hands while spot welding a small metal reinforcing triangle to two pieces forming each corner. The supply of triangles and pieces for frame were on a table just back of operator.

New method, shown in Fig. 7, makes use of a pedestal on which is placed the fixture to hold the pieces. This rotates to position the corners under the spot welder. In center of fixture is a container for the reinforcing triangles. This fixture is more readily positioned for welding since it need only be rotated to come to each successive spot. Reinforcing triangles are more available in the new container. Work is easier for operator since he does not have to hold the frame during welding, nor carry the fixture from bench to welder and back again to bench for reloading.

Production Increased

Time for old and new methods of performing the welding operation was 0.72400 minute and 0.41560 minute respectively. This means a 42-per cent saving in operator's time. It also results in an increase of 74 per cent in productiveness of each welding machine.

Operations which have been improved as described are all more or less repetitive. On a highly repetitive operation with a number of operators, or a few operators running the same product for some time, a detailed written analysis and considerable study may be justified. Each operator on the new method should receive thorough and accurate training.

However, repetitive operations are not the only ones to which motion-time-analysis may be applied profitably. On operations with less production, only improvements which are self-evident to a trained motion study analyst are made. There is

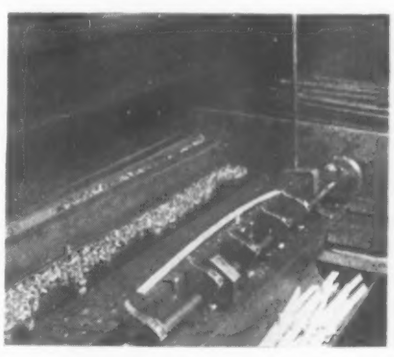


Fig. 5—Close-up view of foot-operated clamp, holding operating bar, and more convenient supply of parts

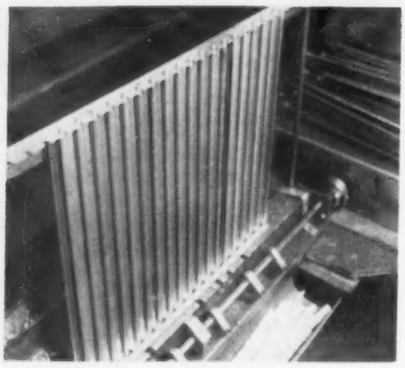


Fig. 6—Notched top support holds shutter blades

no intensive training of the operator to an exact routine of operation.

In job-shop work, operations are classified and improvements worked out for types of production machines or tools, or simply for the class of

Fig. 7—Now turntable fixture with open corners for welds leaves only frame to be handled. Reinforcing triangles are in pan in center

work itself, as for bench molding in a foundry. Certain principles are developed for running each kind of machine, handling certain tools or doing a class of work. These principles may apply to a number of operators on similar work or to only a few operators on work within certain limits.

Maintenance also may be studied by means of motion-time analysis. On maintenance work, or work closely approaching it, the individual worker must be given some training in fundamentals of motion study. Workers then make application of motion study principles to their work.

Develops New Type Rail Cars

■ STREAMLINED appearance is only one feature of the two combination engine-express-mail-passenger railroad units furnished the Missouri and Arkansas railway recently. Built by American Car and Foundry Co., at Berwick, Pa., the two cars have been named respectively "John E. Martineau" and "Thomas C. McRae." They will operate between Joplin, Mo., and Helena, Ark., a distance of 368 miles.

Constructed of special steel alloys and aluminum, each car weighs 66,150 pounds ready for operation and carries 33 passengers and 10,000 pounds of mail. Power is supplied by a 200-horsepower Hall-Scott engine. These mechanical drive rail cars with a horizontal gasoline engine mounted under the floor appear to be a valuable type of railroad equipment, especially on branch line service.

Overall length of each car is 75½ feet. Principal underframe members are high-tensile steel. The box-girder type bolsters were assembled by welding. No center sill is provided since the car is used alone. However, draft sills extend from bolsters to car ends where concealed pockets for an emergency coupler are provided. Side sheathing is aluminum, including a skirt extending down 16 inches from the rail. The pilot is steel-sheathed and braced from four points along its lower edge. Roof is plain arched type sheathed with steel.

Double passenger compartment sashes are provided to lessen the air-conditioning load. Outside sashes are stationary, inside sashes being removable for cleaning. Air-conditioning equipment, rated 5½ tons, consists of two freon compressor units located in compartments at rear of car and accessible from the outside. Evaporators and blowers are mounted in an upper compartment above the rear seat.

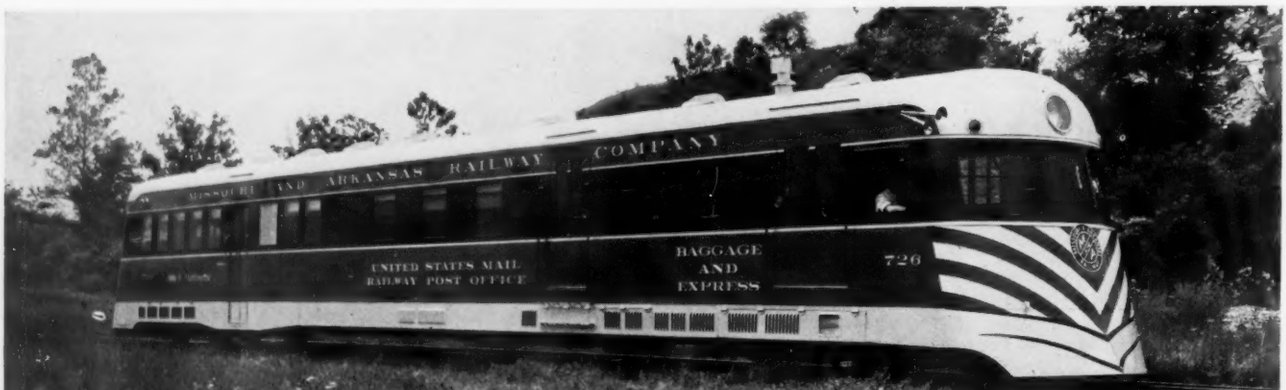
Plenty of Heat

Heating system includes a double coil, coal-fired heater supplying hot water to fin-tube radiators in passenger and mail compartments.

Engine, clutch and transmission are mounted as a unit on the car underframe using rubber mountings. Clutch is single-plate type. Transmission includes a standard and an auxiliary transmission. Four speeds forward and one in reverse are available. A spiral bevel gear arrangement on the drive shaft can be operated to reverse the transmission making the four forward speeds available for long backups.

Engine is started by a 12-volt storage battery charged by a 1200-watt generator driven from the engine by a V-belt. Power is transmitted to front or leading axle of the front truck by a drive shaft which utilizes a fabric disc joint and a needle-bearing universal joint to overcome misalignment on curves. A slip joint on drive shaft permits shaft length to vary as required by truck swing.

One of two streamlined air-conditioned gasoline-driven rail motor cars for the Missouri and Arkansas railway. It contains a horizontal under-floor engine and compartments for engineer, baggage, mail and passengers



Radiography Finds Wider Use in Materials Testing

■ AMONG important sessions of the forty-first annual meeting of the American Society for Testing Materials in Atlantic City, N. J., June 27-July 1, were four dealing with the inspection, testing, specifications and properties of metals. One session was devoted to radiographic inspection; another to effect of temperature on metals and fatigue of metals; a third centered on steel, ferroalloys and corrosion; and a fourth was devoted to cast and wrought iron. A resume of these sessions is given on these pages. Reports of sessions held early in the week were presented in STEEL for July 4, page 19 and 38; additional sessions will be reviewed next week.

The place of radiography in the field of testing was considered in the session devoted to a radiography. John Howe Hall, foundry consultant, Philadelphia, and G. F. Jenks, chief of technical staff, office of chief of ordnance, Washington, served as co-chairmen.

H. H. Lester, Watertown arsenal, Watertown, Mass., presented the report of committee E-7 on radiographic testing. This committee was proposed a year ago, organized in February of this year, held its first meeting at the Rochester regional conference, and arranged the radiography session. Dr. Lester also contributed a paper on the place of radiographic testing in industry, in which he reviewed the history and progress in this type of testing. He stated that while radiography was used first in the foundry, it has had its widest application in the welding field.

Customer Does Inspection

In the latter field, the method has been used almost entirely in the hands of producers of welded structures. The situation with regard to the examination of castings is entirely different, for while a few of the larger companies used the equipment, for the most part the experience with regard to the examination of castings has had to do with acceptance tests made by the customer.

Dr. Lester contended that because the foundryman has not had his own equipment, he has not used radiographic testing as a means to improve the product or to control practices. In his opinion, the present strong trend toward consumer testing should be reversed in the case of castings. Reasons for reluctance on the part of foundrymen to employ the method were given as: Unfamiliarity with the test; fear of the accuracy of results; cost of equipment; and cost of operation.

George C. McCormick, vice president, General Alloys Co., South Boston, Mass., presented a written discussion of Dr. Lester's paper in which he stated that a high percentage of the gross tonnage of castings produced by foundries are for applications not involving vital consequences. Therefore, exploitation of the x-ray in the presumption of complete inspection of such products may result in a loss of consumer confidence in the method or a serious and logical questioning of the capacity or competence of foundries which feel that their production of a certain class of casting needs x-ray inspection to establish consumer confidence.

Defects May Not Harm

Through a series of slides, Mr. McCormick illustrated that a casting showing defects upon x-ray examination may perform well in service and that other castings, free from defects as detectable by x-ray may not have the degree of soundness which the consumer expects. The speaker has investigated the relationship between defects as indicated by the x-ray, and subsequent failures. While he has found cases in which eventual failure is intimately related to or identified with the defective area revealed by the x-ray, he also has found that in several investigations parts may show defects, but fail in areas which apparently are sound.

In conclusion, Mr. McCormick stated that of the fair and proper x-ray tests applied to certain type of castings, the competent foundryman has no fear. Much harm can accrue to the industry as a whole if a radiographic inspection is imposed on castings or structures in cases where there neither is justification nor necessity.

Dr. Herman E. Seemann, physicist, Kodak Research Laboratories, Rochester, N. Y., in a paper "Secondary Radiation in the Radiography of Aluminum, Steel and Lead," discussed experiments in which exposures were made with and without lead foil intensifying screens to determine the effectiveness of screens in removing secondary radiation. Results indicate there is almost a linear increase in production of secondary radiation with increase in thickness of the material. Lead foil screens may remove almost half of the secondary radiation.

A paper, "A Study of Intensifying Screens for Gamma-Ray Radiography," prepared by Charles W. Briggs, physical metallurgist, naval research laboratory, Washington, and Roy A. Gezelius, metallurgist, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., was presented by Mr. Briggs. The paper reported experiments which show that when compared to the standard lead foil intensifying screens, calcium tungstate screens reduce the exposure time considerably. However, the intensity does not vary according to the inverse square law and the sensitivity or definition cannot equal that which may be obtained with the lead foil screen.

"Gamma-Ray Radiography" was discussed in a paper by Gilbert E. Doan, professor of physical metallurgy, and Shang-Shoa Young, research fellow, Lehigh university, Bethlehem, Pa.

Effect of temperature and fatigue of metals were subjects considered at a session at which H. S. Rawdon, chief, division of metallurgy, national bureau of standards, Washington, and Sabin Crocker, engineer, Detroit Edison Co., Detroit, were co-chairmen.

The joint research committee of the A.S.M.E. and A.S.T.M. on effect of temperature on properties of metals, of which H. J. French, International Nickel Co. Inc., New York, is chairman, reported continuance of a number of researches especially with respect to effect of temperature on creep resistance of steels.

Experiments at Battelle Memorial institute on effect of temperature on creep rate of annealed 0.35 carbon steel while loaded to 7500 pounds per square inch indicate a change of creep rate of 5 to 1 for temperature changes 50 degrees above or below 850 degrees Fahr. Physical changes due to time at temperature under load are relatively unimportant. The committee also is sponsoring a number of other experiments to develop standard tests.

Grain Size Affects Creep

A paper on grain size as related to creep strength of steel at elevated temperatures, presented by S. H. Weaver, General Electric Co., Schenectady, N. Y., generated considerable discussion. Thirty-two experiments made with SAE 4330, a nickel-chromium-molybdenum steel, in the General Electric Company's laboratories at the fixed temperature of 840 degrees Fahr. show that a definite relationship exists between grain size and creep strength. Briefly, it is shown that grain size can vary creep strength by 21,000 pounds per square inch and, further, that structure within the grain can change

creep strength by 4500 pounds. It also was shown that continuous strings of ferrite running lengthwise in the steel affect its creep values. Heat treatments, it was pointed out, can change not only this stringing but grain size and grain structure.

The research committee on fatigue of metals is endeavoring to obtain funds for research on the effect of type of testing machines on fatigue test results, F. H. Moore, professor of engineering materials, University of Illinois, Urbana, Ill., reported. A heat treated alloy steel and an "as-rolled" low alloy steel will be studied. An 8 per cent tin-bronze also may be included in the study.

In a paper on effect of stressing on fatigue, J. B. Kommers, professor of mechanics, University of Wisconsin, Madison, Wis., said that endurance limit of a material is not a fixed quantity inasmuch as it may be manipulated by various stressing methods. Tests conducted, he said, show that the damage done by overstress is not always permanent and also that understress usually will increase the endurance limit.

Studies Fatigue Properties

J. S. Kinney, formerly of Rensselaer Polytechnic institute, Troy, N. Y., presented partial results of an investigation of the effects of elevated temperatures on fatigue properties of alloy steels. Tests were conducted in conjunction with the research laboratories of the General Electric Co. on a nickel-chromium-molybdenum steel and a 12 per cent chromium steel to determine their fatigue properties in steam turbine construction.

More and more fatigue experiments in Europe are conducted with shaped parts rather than with special specimens, Richard P. Seelig, Metal Powders Processing Co., New York, reported. Several new testing devices also have been developed in the past few years. Tendency of development is toward simplification of apparatus and procedure on one side and broadening of the validity of test results on the other side.

Reports of committees at the session on steel, ferroalloys and corrosion revealed a great amount of work in the preparation of specifications and standards. W. M. Barr, chief chemist and metallurgist, Union Pacific railroad, Omaha, Nebr., and O. U. Cook, assistant manager, department of metallurgy, inspection and research, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., presided at this session.

Report of committee A-9 on ferroalloys was presented by Charles McKnight, International Nickel Co. Inc., New York, chairman. To bring the nine existing specifications for ferroalloys into closer agreement with commercial practice and requirements, the report, which was adopted, recommended revisions in the following standards: Specifications for spiegeleisen (A 98-27); ferromanganese (A 99-27); ferrosilicon (A 100-27); ferrochromium (A 101-27); ferrovanadium (A 102-27); molybdenum salts and compounds (A 146-34); low carbon ferromolybdenum (A 145-34); ferromolybdenum (A 132-34); and ferrotungsten (A 144-34).

An extensive report of the activities of committee A-1 on steel was presented by Chairman H. H. Morgan, rail and fastenings department, Robert W. Hunt Co., Chicago. The report, which was adopted, included a new tentative standard covering specifications for normalized quenched and tempered alloy steel forgings. Revisions in tentative standards were made in the following: Specifications for seamless alloy steel pipe for service temperatures from 750 to 1100 degrees Fahr. (A158-37T); seamless carbon molybdenum alloy steel pipe for services at temperatures from 750 to 1000 degrees Fahr. (A 206-37T); carbon and alloy steel nuts for bolts for high pressure and high temperature service to 1100 degrees Fahr. (A 194-36T).

Tentative revisions have been made in the following standards covering specifications for: Alloy steel castings for valves, flanges and fittings for service temperatures from 750 to 1100 degrees Fahr. (A 157-36); lap welded and seamless steel pipe for high temperature service (A 106-36); forged or rolled steel pipe flanges for high temperature service (A 105-36); forged or rolled alloy steel pipe flanges, forged fittings, and valve parts for temperatures from 750 to 1100 degrees Fahr. (A 182-36); and alloy steel bolting material for high temperature service (A 96-33).

Standards Are Approved

The following tentative standards, covering specifications, were adopted as standard: Structural nickel steel (A 8-36); seamless cold drawn alloy steel (4 to 6 per cent chromium) heat exchanger and condenser tubes (A 187-36T); seamless alloy steel (4 to 6 per cent chromium) still tubes for refinery service (A 188-36T); chrome manganese silicon steel plates for boilers and other pressure vessels (A 202-37T); molybdenum steel plates for boilers and other pressure vessels (A 204-37T) with editorial change; and cold rolled strip steel (A 109-35T).

The report also provided for adoption as standard of tentative revisions in the following standards: Specifications for structural rivet steel (A 141-36); specifications for high tensile strength carbon steel plates for pressure vessels (plates 2 inches and under in thickness) (A 149-36) with editorial change; specifications for high tensile strength carbon steel plates for fusion welded pressure vessels (plates 2 to 4 inches inclusive in thickness (A 150-36) with editorial change; and specifications for boiler and firebox steel for locomotives (A 30-33).

A paper, "Physical Properties of Four Low-Alloy High-Strength Steels," by W. L. Collins and T. J. Dolan, associate professor and assistant professor, respectively, University of Illinois, Urbana, Ill., related to tests made to obtain information on load-resisting properties of four low-alloy, high-strength steels and one ordinary structural carbon steel when subjected to static, impact and repeated loads. Results indicated that two of the low-alloy high-strength steels have considerably higher ratios of yield point to tensile strength than ordinary structural carbon steel and have about the same ductility. All steels tested had well-defined yield points as determined by drop of beam when gage lengths of 8 inches were used.

Specimen Influences Results

The authors explained that properties obtained from impact tests apparently depend upon the type of specimen used. For repeated load specimens free from abrupt changes in section and tested in air, the four alloy steels had endurance limits at least 67 per cent greater than the structural carbon steel. However, the low-alloy steels exhibited greater fatigue notch sensitivity, and were damaged to a greater extent by corrosion fatigue.

Report of sectional committee on standardization of dimensions and material of wrought iron and wrought steel pipe and tubing was presented by H. H. Morgan, chairman. The committee is endeavoring to encourage the wider acceptance and use of schedules for wrought iron and wrought steel pipe by continued education of distributors, jobbers and users of pipe.

Report of committee A-10 on iron-chromium-nickel and related alloys, was presented by Chairman Jerome Strauss, vice president, Vanadium Corp. of America, Bridgeville, Pa. The report, adopted at the meeting, provides for revision of tentative standard covering specifications for corrosion-resisting chromium-nickel steels (sheet strip and plate) (A 167-35T), and the adoption of tentative standards as standard on specifications for corrosion resisting chromium steels (sheet, strip and plate) (A 176-35T) and specifications for high-strength corrosion-resisting chromium-nickel steels (sheet and strip) (A 177-35T).

Peter R. Kosting, Watertown ar-

(*Please turn to Page* 47)

British Foundrymen Study Cement Molding Process

■ CONDUCTING its thirty-fifth annual conference in Bradford, England, leading city of the West Riding of Yorkshire, June 14-17, the Institute of British Foundrymen engaged in a technical program which embraced the manufacture of gray iron, steel and nonferrous castings.

Joseph Hepworth, director, Bradford Piston & Piston Ring Co. Ltd., Bradford, was elected president to succeed C. W. Bigg, managing director, Qualcast Ltd., Derby. W. B. Lake, governing director, Lake & Elliott Ltd., Braintree, was named senior vice president, and Maj. R. Miles, Teesdale Ironworks, Thornaby-on-Tees, junior vice president.

Five council members for two years were electetd as follows: H. Bunting, past president, East Midland branch; Dr. A. B. Everest, Mond Nickel Co. Ltd., London; J. W. Gardom, chairman, technical council and technical committee; Ben Hird, past president, Wales and Monmouth branch; and F. K. Neath, past president, West Riding of Yorkshire branch. At a recent meeting of the council, S. H. Russell, director, S. Russell & Sons Ltd., Leicester, was re-elected honorary treasurer; and Tom Makemson, Deansgate, Manchester, was reappointed secretary.

Medals Are Awarded

The Oliver Stubbs medal was awarded to S. E. Dawson, chief metallurgist, Stanton Ironworks Co. Ltd., Nottingham. The E. J. Fox medal, awarded for the second time, was given to J. E. Hurst, Bradley & Foster Ltd., Darlaston, for his numerous contributions on the constitution of cast iron. E. J. Fox, managing director, Stanton Ironworks Co. Ltd., Nottingham, and donor of the medal, was elected an honorary member.

Diplomas for outstanding papers read before the institute's branches during the year were awarded to: A. Tipper, Fordath Engineering Co. Ltd., West Bromwich, Staffordshire; A. Phillips, Lancashire branch; P. C. Fassotte, Association Technique de Fonderie of Belgium; B. McDougall, Scottish branch; and J. Cameron Jr., Cameron & Roberton Ltd., Kirkintilloch.

In his presidential address, Joseph Hepworth referred to changes taking place in the foundry industry and their effect upon personnel. Positions which at the end of the war were considered of little importance have developed into posts requiring considerable executive ability. Growth of specialization, greater use of technical knowledge, and increased mechanization, have developed men possessing a combination of technical knowledge and experience. Mr. Hepworth also mentioned formation of an institute branch in South Africa, which is beginning to flourish.

One of the important papers presented was on the Randupson process of cement molding, contributed by F. W. Rowe, chief metallurgist, David Brown & Sons Ltd., Huddersfield. Although developed several years ago, the process has undergone considerable improvement. Among disadvantages of the process, Mr. Rowe cited the time needed for setting and space occupied by the molds during setting, the fact that all sand has to be put through the mixing plant, and old sand has to be regenerated with fresh cement.

Among advantages, the speaker pointed out that no flasks and drying ovens are needed; castings are truer to pattern, and there is no scabbing. With suitable sand and working of the process, blowholes are eliminated.

In discussion, E. Longden, Manchester, questioned economic advantages of the process if output is small and pointed out that in certain cases it is necessary to use flasks. In reply, Mr. Rowe stated that the process is not intended to compete with green sand molding. He pointed out, however, that some green sand molds may take a week to be dried and completed, while with Randupson process the same mold could be prepared in a day and allowing for setting, considerable time can be saved.

Process an Advance

One speaker mentioned the high cost of breaking up molds, and another asserted the process tends to reduce skilled labor. R. Ballantine, Fulwood Foundry Co. Ltd., Mossend, Glasgow, said he was responsible for making 200 tons of castings a week and regarded the process a distinct advance, although it must be adapted properly.

Ben Hird, Stamford, Lincolnshire, inquired if contraction of the mold makes it difficult to remove a casting from the mold. Mr. Rowe said that in his experience no trouble has been encountered with contraction. A visitor, who operates a foundry in Hong Kong, asked whether humidity in certain climates would affect operation of the process. To this the author replied that setting time is affected more by temperature than humidity.

L. E. Benson and H. Allison, Metropolitan-Vickers Electrical Co. Ltd., contributing a paper on relief of internal stress in castings, dealt with relief of stresses by certain forms of heat treatment. The authors expressed the opinion that distortion of castings and forgings during machining is due largely to internal stresses taking place initially, and that these stresses are revealed only when removal of metal on machining disturbs the balance. Another fallacy which the authors wished to explode was that, in steel castings and forgings, objectionable internal stresses revealed by machining are due to casting or forging conditions. The authors described experiments they had made on cast iron, carbon steel, admiralty gunmetal and high-tensile bronze to obtain information on the degree of stress relief to be obtained from different annealing treatments.

Temperature Creates Debate

Dr. A. B. Everest, Mond Nickel Co. Ltd., London, said practical experience shows that some castings can be heat treated at a relatively low temperature, and queried the temperature of 550 degrees which the authors appeared to indicate as a minimum. He also suggested that it is more important to deal with high stresses that are localized than to deal with the uniform stresses spread over a casting.

E. Longden, referring to a remark that aging does not relieve stress, said in his opinioin aging does bring about relief, and he added that aging is greatly helped by vibrations. T. H. Turner, of Doncaster, confirmed that rumbling relieves stresses, and this point was confirmed by Ben Hird and F. J. Cook. C. H. Kain, Lake & Elliot Ltd., Braintree, asked for a definite maximum figure for the cooling rate; in reply, the authors stated the rate depends upon shape and mass of the casting, no precise answer is possible. Large castings should be cooled for days, sometimes for weeks, in the furnace to obtain full effect of the heat treatment.

English and American steel foundry practice was discussed in a paper by Dr. C. J. Dadswell, English Steel Corp. Ltd. In his conclusions, he stated that a study of American steel foundry practice dispels the prevalent impression that American products are much inferior to British.

A nonferrous session comprised two papers on aluminum alloys and one on brasses. The first paper was the French exchange paper of the Association Technique de Fonderie

on "Heat-Treatable Aluminum-Silicon Casting Alloys," by Gaston G. Gauthier, head of research department, Compagnie Alais, Froges et Camargue, Chambery. The author gave results obtained in researches on heat-treatable aluminum-silicon alloys containing, in addition, magnesium, manganese or cobalt.

In his conclusions, the author stated that heat-treatable aluminum-silicon casting alloys represent a considerable advance over ordinary silicon alloys from the point of view of mechanical properties. In addition, these alloys possess casting qualities almost equal to those of ordinary aluminum-silicon alloys. While it is true that these properties are surpassed by certain alloys containing copper and titanium, Mr. Gauthier said it is hoped further research will improve results.

Removing the Gases

The German exchange paper of the Technischer Hauptausschuss fur Giessereiwesen, Dusseldorf, was contributed by Dipl.-Ing. G. Gurtler, Metallgesellschaft A. G., Frankfurt a. M., the subject being "Aluminum Casting Alloys." The author discussed various problems relating to foundry practice and metallurgy recently studied in Germany. He stated that removal of gases from the melt is best effected by a combination of salt treatment and standing in a neutral atmosphere.

Absorption of gases from the mold can be reduced by lowering the pouring temperature, shortening the period of flow and increasing the rate of cooling. Influence of titanium on fatigue strength of alpax with various silicon contents was discussed, as was also influence of various heat treatments. In the case of this and certain other alloys, increased solubility of Mg_2Si at high temperatures is utilized for improving mechanical properties of heat treatment.

Some physical factors in casting high-strength brasses was discussed by J. E. Newson, Manganese Bronze & Brass Co. Ltd., London. The author stated the object of the paper was to consider some of the less important factors, with special mention of those which are of interest in the casting of high-strength brasses, these alloys having been chosen because they illustrate these factors well and because they are used for some of the largest nonferrous castings in production. Among the factors studied were specific heat, latent heat of fusion, thermal conductivity, freezing range, casting temperatures, and mold material.

The exchange paper of the American Foundrymen's association was written by Dr. J. T. Mackenzie, American Cast Iron Pipe Co., Birmingham, Ala., on "Chemical Changes of Cast Iron in Cupola Melting."

A contribution from the British Cast Iron Research association was a paper on the influence of copper in cast iron, by A. J. Nicol Smith. The investigation dealt first with addition of realtively widely-spaced additions of copper to a series of base irons covering a wide range of composition. This preliminary investigation formed the first part of the paper, and was followed by a discussion in greater detail of the influence of smaller quantities of copper on a more limited range of base materials, covering approximately the engineering iron of the present day.

In discussion, A. Tipper, Fordath Engineering Co. Ltd., West Bromwich, Staffordshire, asked whether copper helps in castings having various thicknesses. The author replied that up to 1 per cent copper is helpful, but from 2 to 3 per cent seems to have a retrograde action. One speaker asked if there is a difference in the effect of copper whether it is added in the cupola or in the metal. Mr. Smith said there would be little difference, as far as could be ascertained from tests made in crucible-melted iron.

J. Blakiston, manager, Modern Foundries Ltd., Halifax, presented a paper on "Modern Manufacture of Machine-Tool Castings." After summarizing the properties required from iron used for machine tool castings, the author reviewed present-day melting practice both in the cupola and in the rotary melting furnace, molding methods, and the refractory materials used.

Mention having been made of the practice of putting turnings in the bottom of the ladle, this question was the subject of some discussion. Daniel Sharpe, Glasgow, stated that it is common practice to put sheets of tinned steel at the bottom of the ladle. F. J. Cook explained that turnings sometimes are used; these are in the form of thin ribbons. A. Harley also mentioned this practice and said that although perhaps it is not scientific it is effective.

"Blasting" Better Term

A contribution from the Institute of Vitreous Enamellers on sand-blasting as applied to the vitreous enamelling process, was presented by H. Whitaker. The author pointed out that "blasting" would be a better general term to describe the process, as nowadays sand is little used—in Great Britain the abrasive generally is crushed iron grit. The paper reviewed the equipment required for blasting, nature of various abrasives, operating troubles, and precautions to combat silicosis.

In discussioin, it was stated that air pressure of 30 pounds quoted in the paper was low; most enamellers would use from 40 to 45 pounds. One speaker reported he found round shot better than angular shot, because it caused less wear to the equipment. J. W. Gardom referring to a statement in the paper to the effect that one of the objects of blasting is to roughen the surface of the casting and thereby cause a "bond" which enables the enamel to grip the metal, said he doubted the exactitude of this remark.

Dealing also with the question of the skin, V. C. Faulkner referred to the chemical action of enamelling and said that it is necessary to increase the surface of the casting as much as possible to get a better reaction.

Erects Frameless Steel Manufacturing Building

■ **Factory of Fred D. Pfening Co., Columbus, O., built by Steel Buildings Inc., Middletown, O. Insulated frameless steel construction is used throughout. Wall and partition panels are 3 inches thick with sheet steel faces and insulated with expanded mica. Cellular roof panels are 5½ inches thick. Exterior steel surfaces are painted. Building is 65 x 100 feet overall**

GULF WINS

1ST, 2ND, 3RD AT INDIANAPOLIS!

Winner Floyd Roberts averaged 117.2 M.P.H. in the 500-mile classic.

Wilbur Shaw averaged 115.5 M.P.H. to finish second.

Chet Miller averaged 114.9 M.P.H. to finish third.

Record-breaking drivers use GULFPRIDE OIL!

All three winners of the Indianapolis Memorial Day Race used—not special racing castor oils—but regular, stock Gulfpride . . . certified by the AAA Contest Board to be the identical oil sold by Good Gulf dealers everywhere!

Here's what the winners say about Gulfpride:

"Perfect lubrication provided by Gulfpride Oil played an important part in helping us win first, second, and third places in the 500-mile Memorial Day Race here at Indianapolis. Unfaltering performance of our engines throughout the gruelling race enabled us to attain faster average speeds than ever before had been achieved at this speedway."

{Signed} Roberts, Shaw, Miller

These three all-time record-smashing performances testify to Gulfpride's ability to stand up under punishment. That's why Roberts, Shaw, Miller and many other prominent racing drivers choose Gulfpride over even special racing oils. The reason is that Gulfpride is the world's only 100% Pure Pennsylvania oil refined by the Alchlor process, *in addition to* conventional methods.

This same refining process is used in the preparation of Gulf's finest industrial lubricants. Thus, operators of steam turbines, air compressors, Diesel engines and many other types of industrial equipment can secure for their engines and machines the same protection against friction, wear and repair expense that Roberts, Shaw and Miller received from Gulfpride Oil when they made three all-time records . . . Gulf Oil Corp., Gulf Refining Company, Gulf Bldg., Pittsburgh, Pa.

GULF INDUSTRIAL LUBRICATION

Welding Economics

Effect on welding costs of electrode performance and power consumption are discussed in Part II, here. Method is outlined for plotting curves to show cost relationships

Part II

By E. W. P. SMITH
Consulting Engineer
Lincoln Electric Co.
Cleveland

■ ELECTRODE performance must also be considered in relation to costs. The price per foot or per pound of deposited metal, not the price per pound of electrode purchased, is the important thing to determine in figuring electrode costs. It might be said that deposition efficiency and speed are the determining factors because it must be true that the physical performances for the electrodes to be compared are the same or nearly so.

Effect of speed is illustrated in Table III, using a figure of $2.00 per hour as cost of welding. Note that setup time is not changed but because of arc speed increase there is a marked rise in production with no increase in equipment or floor space. While this may appear rather elementary it is quite frequently overlooked in actual practice.

Effect of Speed

Table III

Time and Cost to Weld 100 Feet

Arc speed (feet per hour)	20	25	30	40
Arc time	5	4	3.3	2.5
Set up time, hours	2	2	2	2
Total time, hours	7	6	5.3	4.5
Total cost	$14.00	$12.00	$10.60	$9.00
Cost reduction	.....	$2.00	$3.40	$5.00
*Increase in production, per cent	.....	17	32	55

*Based on 7 hours as standard.

Abstract from paper read at semi-annual meeting of American Society of Mechanical Engineers at St. Louis, June, 1938. (Note: Part I carried wrong footnote.)

A combination of the consumption rate and speed, using data taken from actual tests, shows some interesting results. Two electrodes of the stated characteristics were compared with results in Table IV. The welding metal deposited was comparable, as yield point was 51,100 and 53,100; tensile strength 64,800 and 65,100; and per cent elongation in 2 inches was 19.9 and 23.1, respectively.

Higher Rate Preferred

The higher rate of deposition thus is preferred but full effect of this on the cost is not realized readily unless the cost is calculated on the basis of a certain amount of metal such as 10,000 pounds. Assume labor costs $1.00 per hour, power $0.02 per kilowatt hour, electrode material $0.085 per pound and an operation factor of 50 per cent. Then time in hours to deposit 10,000 pounds is 10,000 over 7.22 x 0.50 or

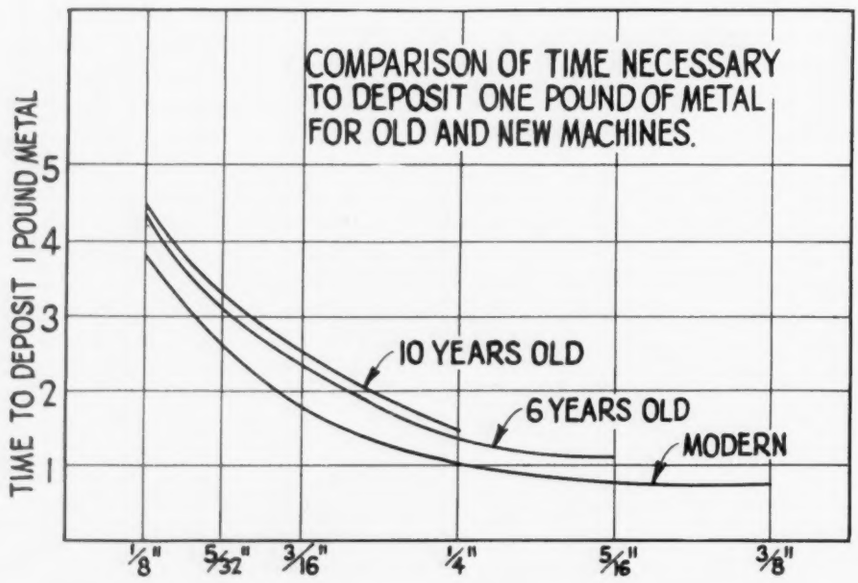


Fig. 4—Shows relation of speed of old and new welding equipment in depositing with various size rod

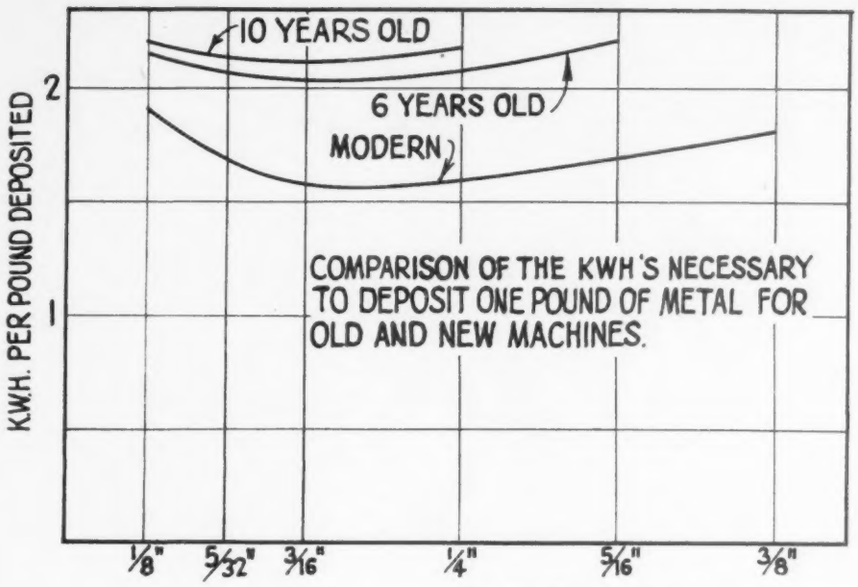


Fig. 5—Shows reduced power consumed by new welding equipment with various size rod

2770 hours and 10,000 over 8.62 x 0.50 or 2320 hours, respectively. Kilowatt hours to deposit one pound becomes 11.56 over 0.595 x 7.22 or 2.69 and 11.56 over 0.596 x 8.62 or 2.25, respectively. Adding 10 per cent to results to take account of idling losses, power for 10,000 pounds is 29,600 and 24,800 kilowatt hours, respectively.

Electrode required is 10,000 over 0.6906 or 14,480 pounds and 10,000 over 0.7245 or 13,800 pounds, respectively.

Rod Comparison

Table IV

Size	¼	¼
Amperes	340	340
Volts	34	34
Arc kilowatts	11.5	11.56
General efficiency, per cent	59.5	59.5
Coating per cent in 14 in..	22.2	20.1
Weight electrode used, lbs.	1.60	1.56
Weight stub ends	0.231	0.386
Electrode used, net pounds	1.369	1.174
Weight plate plus deposit	15.860	15.790
Weight plate	14.915	14.940
Weight deposit	0.945	0.850
Time, minutes	7.867	5.916
Per cent loss	30.94	27.55
Metal deposited per hr. lbs.	7.22	8.62

Shows Comparison

Table V then shows comparison and total cost reduction thus made possible.

Six cents per pound deposited is about 4½ cents per pound purchased, which is a considerable item—about 50 per cent of the purchase price of electrode material.

Power consumed also is an important item. It usually is supplied by welding generators, driven by an electric motor, and this arrangement will be used in illustrating power costs. To keep costs down in selecting a generator, the most modern equipment available should be used. Figs. 4 and 5 show test results made on generators of different sizes, and demonstrate the economy of using a modern generator.

Next is to determine the generator size. To do this properly it is necessary to know size and type of joints as well as plate thicknesses involved, not only as to dimension but also the percentage of total shop production for each thickness. These plate thicknesses can be expressed in terms of welding as arc amperes. Generators of different sizes have different efficiency curves.

In calculating power costs, efficiency is the governing item and larger electrodes operating on a larger machine result in operation at a point of higher efficiency and therefore power costs per unit of metal deposited are lower.

If costs are plotted against arc amperes, then the curves shown at right of Fig. 6 are obtained. The labor charge is the hourly labor rate divided by the operating factor, or it may be labor charge plus overhead, just so total obtained is the cost per hour of operation. These are added to the curves for electrode

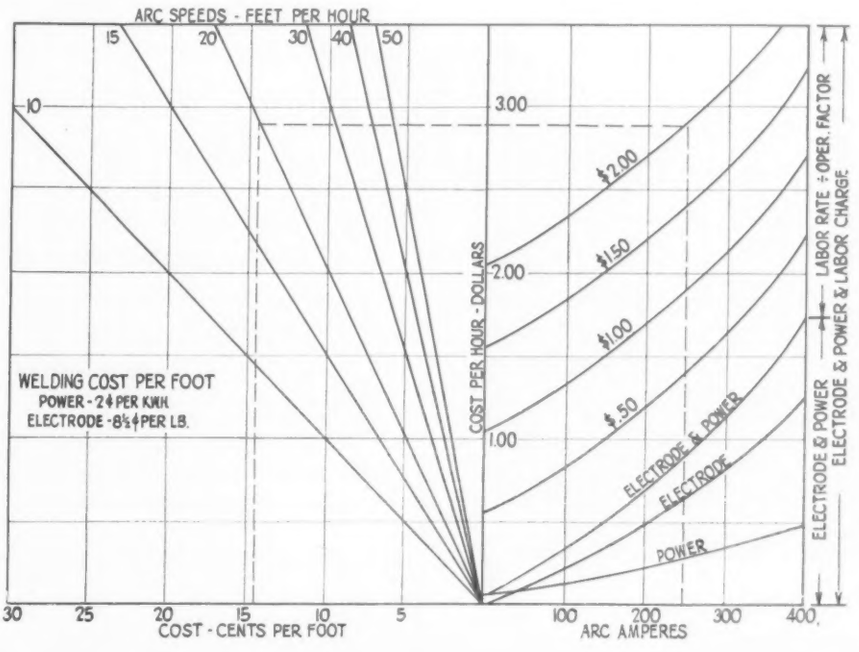


Fig. 6—Composite curves showing cost relationships

Summation

Table V

Total Costs in Depositing 10,000 Pounds		
Labor	$2,770	$2,320
Power	592	496
Material	1,231	1,175
	$4,593	$3,991

Cost reduction $602 total, or 6 cents per pound.

Simplified Costs

Table VI

Amperes	120	200	300	400
Electric power cost	37.9	68.7	113.5	172.4
Labor item	150	150	150	150
Total	187.9	218.7	263.5	322.4

THE ROLL WITH THE RED WABBLER

"Techno

ROLLS BY THE "TECHNI" PROCESS

"Technichill" Rolls
"Technigrain" Rolls
"Technisand" Rolls
"Technalloy" Rolls
"Technisteel" Rolls

ALSO

"Techniron" Castings
"Technisteel" Castings

THE "TECHNALLOY" ROLLS ARE:

"TECHNALLOY" STANDARD (minus 1.00% Carbon),

"TECHNALLOY" A. (1.20—1.30% Carbon), and "TECHNALLOY" B. (1.80—2.00% Carbon). All possess greater hardness and strength than rolls of similar composition made under standard practice.

"TECHNALLOY" D. (2.20—2.30% Carbon). For large section finishing and small section intermediates.

"TECHNALLOY" E. (2.40—2.60% Carbon). They have the wearing and finishing characteristics of cast iron, with the strength and shock resistance of steel. For finishing processes, on all sections down to ⅛" thickness.

TRADEMARKED

NEW RECORDS FOR STEEL BASE ROLLS

PATENT APPLIED FOR

nalloy Rolls

"Technalloy" Rolls have increased strength and greater hardness than similar compositions of ordinary steel base rolls. They have an absolute freedom from blow holes, streaks and spots of impurity segregation.

Rolls produced by the Techni Process are tougher, with finer-grained necks and bodies. Denser chill, ideal response to heat, and minimum fire cracking result in exceptional tonnages per roll. Precise foundry control assures absolute uniformity.

Techni Rolls will eliminate your roll troubles. They will help you to cut costs and increase your production. Let us tell you the details about Mackintosh Rolls made by the "Techni" Process.

MACKINTOSH-HEMPHILL CO., Pittsburgh and Midland, Pa.

and power cost as shown at the right.

Then for any arc-ampere value such as 250 ampere (lower right-hand horizontal scale) with labor at $1.00 per hour, operating factor 50 per cent, the labor item equals $2.00 (1.00 ÷ 50 per cent). For an arc speed of 20 feet per hour the cost is obtained by starting at 250 amperes—going to the labor curve marked $2.00, horizontally to the arc speed curve in upper left-hand section and down to cost per foot, 14.5 cents for this example. Position, type of joint, deposition efficiency—all govern speed. If, therefore, the total cost of operation is divided by the speed all factors are accounted for.

Can Be Simplified

For individual use in specific cases, these curves can be simplified further. Suppose power and electrode figures are as given above, 2 cents per kilowatt hour and 8½ cents per pound, labor is $1.00 per hour and operating factor is 66 2/3 per cent. Labor item is $1.50 per hour. Our tabulation then is shown in Table VI.

Then amperes and the cost scale are plotted to give directly the cost per foot of weld as shown in Fig. 7. These three items—labor, electrode, power——are the basic ones of welding costs.

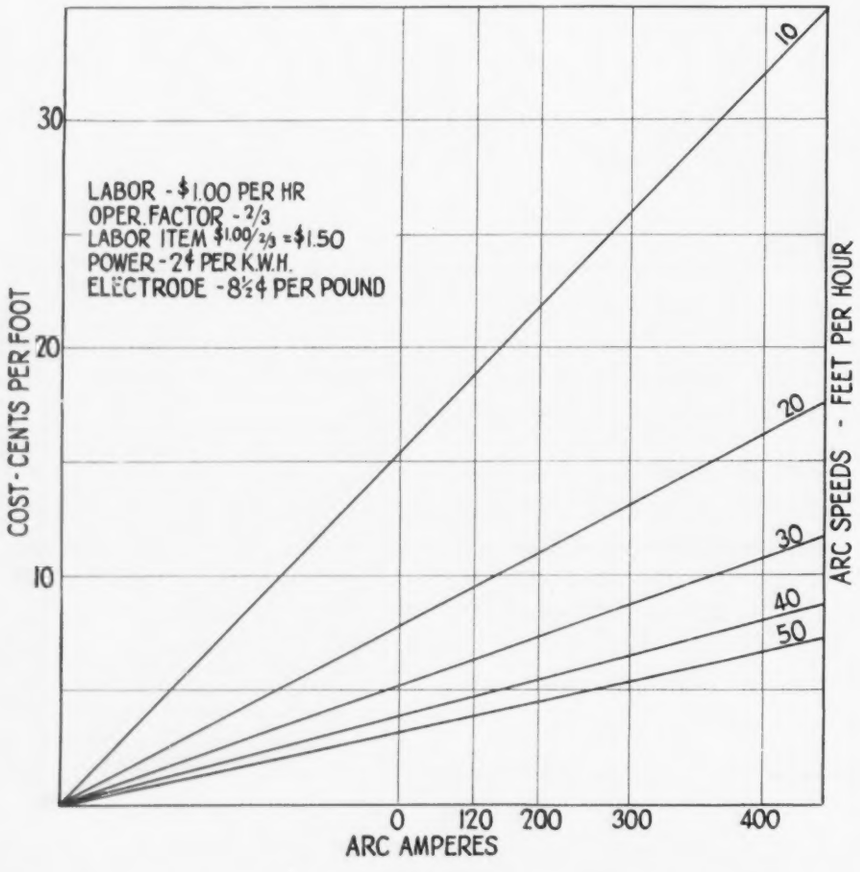
But even these are influenced by and may influence the final or finishing treatment. Such treatment may be as simple as painting or nameplating. Painting involves accessibility, which may be a matter of preparation.

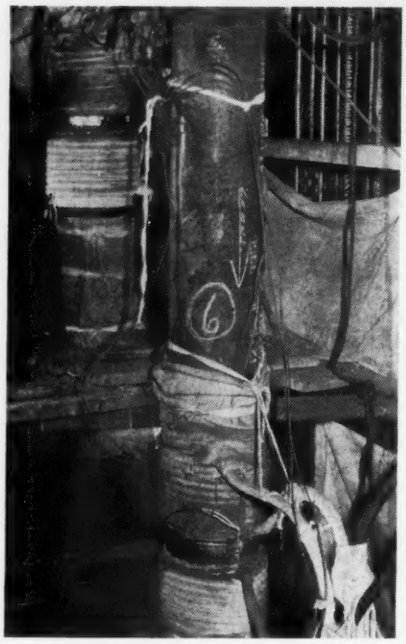
Stress relieving or heat treatment may involve special consideration in preparation and handling; collapse or deformation when metal is soft; support; and provision for escape of gases. There must be no completely enclosed parts, otherwise the expansion of the air would cause deformations. All of these must be given careful thought and their inter-relation thoroughly studied.

Thus final treatment or finishing process is related to preparation, the method of handling of joints or sub-assemblies, these in turn effecting labor, electrode and material costs.

Summarizing, welding costs are reduced by use of larger machines and larger electrodes; increasing operating factor, positioning, and careful consideration of all related factors detailed above.

Fig. 7—Simplified cost relationship curves





Pipe is preheated before welding and normalized after welding by hysteresis and eddy currents induced by coils carrying alternating current

New Method Eliminates Stresses in Welding

■ Introduction of high strength alloys such as used in high pressure piping in modern power plants requires definite control of temperatures both before and after welding to assure best results.

A system called "gradient welding" was used on such work at the Essex plant of Public Service Electric & Gas Co., Newark, N. J. Heating is accomplished with specially arranged coils of wire on both sides of the weld through which 60-cycle current is fed at predetermined amperages according to the size of pipe involved. Pipe is heated by hysteresis and eddy current losses.

Before welding, pipe is preheated to at least 400 degrees Fahr. Heat is maintained throughout welding and raised to the normalizing temperature after welding. Temperatures are under pyrometric control, taps and switching arrangements permitting temperature to be held at any point. Advantages claimed for the process include control of contraction, expansion, grain size and weld strength. Electric Arc Cutting & Welding Co., Newark, N. J., has obtained rights to promote use of the process.

Makes Fibre Lamp Guard

■ A portable electric-lamp guard recently introduced by Safeguard Electric Co. Inc., 1 De Kalb avenue, Brooklyn, N. Y., uses a vulcanized fiber cage to protect the lamp. Cage is locked to rubber lamp socket and handle by a patented vulcanized-rubber locking ring.

Radiography Finds Wider Use in Materials Testing

(*Concluded from Page* 38)

senal, Watertown, Mass., presented a paper on surface cracks on large 18-8 chromium-nickel alloy steel castings, in which it was pointed out that castings of this type with large cross section are likely to have intergranular cracks starting at their surfaces and penetrating up to ⅜ inch. The author stated free machining analyses are more prone to have these cracks than the regular grade. Etching usually is required to reveal the cracks. It was suggested that fine-grain castings will not be prone to such cracking if cooled either quickly or slowly and that they may exhibit such cracks if cooled at an intermediate rate. Mr. Kosting brought out the fact that quenching such large castings from high temperatures is limited to a thin skin which easily may be removed in fabrication.

Reports on Corrosion

Report of committee A-5 on corrosion of iron and steel was presented by W. H. Finkeldey, Singmaster & Breyer, New York, who recently was elected chairman. The report, which was adopted, contains a new tentative standard covering the method of test for uniformity in coatings by the copper sulphate dip test (Preece test) on zinc coated (hot galvanized) steel castings and forgings, gray iron castings and malleable iron castings; a tentative revision of standard specifications for zinc coated (galvanized) iron and steel sheets (A 93-27); and adoption as standard of the tentative standard covering the method of test for uniformity of coating by the Preece test (copper sulphate dip) on zinc coated (galvanized) iron or steel wire (A 191-36T) as revised.

A report of subcommittee VIII of the committee on corrosion on field tests of metallic coatings was presented by R. F. Passano, research engineer, American Rolling Mill Co., Middletown, O., chairman. Interesting data on the exposure tests of coated steel sheets at five different locations was included in the report.

Thomas Spooner, manager, general division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., presented the report of committee A-6 on magnetic properties. Recommendations adopted include a new test for measuring interlamination resistance of steel; and revisions of standards on methods of test of magnetic properties of iron and steel (A 34-36) and definition of terms, with units and symbols relating to magnetic testing (A 127-36).

Four committee reports and three technical papers were presented at a session on iron, at which Dr. A. E. White, retiring president of the society, and Prof. H. F. Moore, University of Illinois, Urbana, Ill., were co-chairman. Report of committee A-2 on wrought iron, presented by Chairman J. Bertram Young, engineer of tests, the Reading Co., Reading, Pa., proposed a revision of standard specifications for welded wrought-iron pipe (A72-33) for immediate adoption, and the revision of tentative standard specifications for rolled wrought-iron shapes and bars (A207-37T). The report was adopted.

Report of committee A-3 on cast iron was presented by Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala. The report, which was adopted, recommended a tentative revision of standard specifications for gray iron castings for valves, flanges and pipe fittings (A126-30), and the adoption as standard of tentative standard specifications for cast iron culvert pipe (A142-35T), as revised.

Subcommittee VI on general castings has appointed a new subgroup to investigate the 2-inch bar in the 60,000 pound class of iron. Subcommittee XIX on chilled and white iron castings, organized in March, 1938, will investigate properties of this class of castings. Subcommittee II on pipe has been disbanded and two new subcommittees, one on soil pipe and one on pressure pipe are being organized to replace it. Report of committee A-7 on malleable iron castings was presented by Hyman Bornstein, Deere & Co., Moline, Ill.; no recommendations were made affecting standards.

An important contribution to literature on chilled iron was presented by S. C. Massari, metallurgist, Association of Manufacturers of Chilled Car Wheels, Chicago, in a paper on properties and uses of chilled iron. Mr. Massari discussed the basic metallurgy of chilled irons, including the technique of production, heat treatment, effect of various alloys upon chilled iron, and practical application of that material where resistance to wear and deformation under high intensities of pressure are essential requisites.

Mr. Bornstein, discussing the paper, emphasized the use of chilled white iron in the farm implement field. He pointed out how it had been possible to produce bearings requiring high wear resistance by using cupola white iron with a carbon content of 3.5 per cent.

Investigating Cupola Control

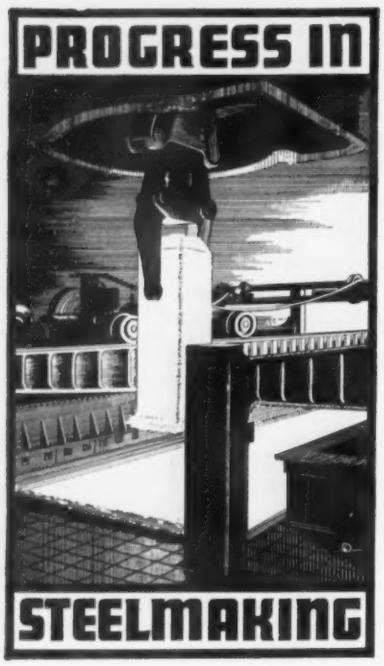
A written discussion by Ralph S. MacPherran, chief chemist, Allis Chalmers Mfg. Co., West Allis, Wis., raised the question concerning closed cupola control in the manufacture of chilled iron. Mr. Massari stated that the Association of Manufacturers of Chilled Car Wheels now is conducting an investigation which is expected to provide further data on this subject.

A paper on effect of size and type of specimen on the torsional properties of cast iron by Jasper O. Draffin, professor, and W. L. Collins, associate, University of Illinois, Urbana, Ill., reported further on an extended series of tests. A year ago the authors presented data on the tensile strength of cast iron, dealing principally with a means of finding that property accurately. The authors intend to make a series of tests through the entire range of tension, torsion, compression and bending, on the same kind of iron, hoping that it may be possible to correlate the strengths of cast iron under different kinds of stresses.

In a paper dealing with hardness measurements of hard steels and white cast iron, J. S. Vanick and J. T. Eash, metallurgists, development and research division, International Nickel Co. Inc., Bayonne, N. J., reported results of an investigation using brinell, scleroscope, Rockwell and Vickers tests. It was said that the discord in relationships emphasizes the importance of specifying the type of test which possesses a narrower dispersion from the average of individual tests with other methods, with a tolerance on either side of the average sufficient to encompass the expected spread in values.

Travels on Monorail

■ **Filling a hand ladle from a big traveling cupola ladle in the foundry of Pontiac Motors Corp. Several overhead ladles, with cab controlled hoists, run on a monorail system from cupolas to supply hand ladles all along the casting lines**



Distribution of Stock

Increasing stock-line diameter of blast furnace aids operation. Charging furnace as described here reduces flue dust losses to low total of 24 pounds in one instance

By J. P. DOVEL
1415 N. Thirtieth street
Birmingham, Ala.

■ CORRECT distribution of stock in a blast furnace has been discussed for many years, centering chiefly about properly placing stock on bell. The diagram on page 49 shows ore charge completely enveloped by coke charge. This condition is made possible only by the physical nature of these two substances. Ore dumped into furnace over a bell valve will repose at a steeper angle than coke dumped over the same valve, the angle of repose being affected in either case by speed with which valve is opened and amount of clearance between valve and its seat. If bell is opened at moderate speed, ore will commence to flow as soon as bell valve begins to open and will flow gradually as the bell opens to take its natural repose.

Coke, however, is in lumps and very light, so it will not begin to flow until bell valve is almost wide open when it will discharge rapidly and with a splash which has a flattening effect. This makes it possible to envelope completely the ore charge within the coke charge. Thus coke charge acts as a filter preventing the escape of the fine ore as flue dust. This condition in connection with sufficient stock line area reduces the flue dust loss to a minimum. Typical tests show 59 pounds, 42 pounds and 24 pounds total flue dust losses.

Fines Sealed

Diagram indicates that doubling size of this ore charge would distribute the upper half of the charge almost uniformly clear across the furnace. In either case, the finer particles of ore would be near the peak of periphery of charge, leaving coarser particles near wall and through center. Also it will be observed that if ratio of valve diameter to wall diameter is increased, ore is placed closer to wall. Reason for this is that as ore passes downward it reaches a temperature where fines become plastic and where they are completely sealed off from the brick wall by the coke. It is well-known that iron ore will flux with brick at a moderate temperature to form what operators call a scab or scaffold. This is sometimes sufficiently serious to cause the furnace to be blown out.

If above conditions have been complied with carefully, the finest kind of ore can be used without excessive flue dust losses. Experiments, such as recrushing self-fluxing ore to pass ¾-inch mesh to produce large quantities of fine ore, or grinding a considerable quantity of these ores in a rod mill, have shown there is no need to sinter any ore used in connection with ore that would be retained on ½-inch mesh

Facilitates Sheet Unloading

■ Sheet steel, strapped in 2-ton bundles, is unloaded from gondola cars using electric lift hoist and Monotractor unit for handling on monorail, operator simply pushing contact buttons on hanging control as shown. Photo courtesy Inland division, General Motors Corp., Dayton O.

screen. Amount of dust blown out is so low in iron content that it would not justify putting it back in the furnace.

Also it will be observed from the diagram that two distinct paths of least resistance to the gas flow are established and that the two are connected by a blank of coke between the ore charge so gases will have same rate of flow and same temperature along wall and through center. Thus, denser portion of ore charge around periphery will be exposed to extreme heat from both sides. This exposure to high temperature in the presence of carbon causes a very rapid reduction of the fine particles of ore, similar to that which would take place in an electric furnace. This form of reduction will commence at a temperature of about 1000 degrees Fahr. However, reduction of lime rock, or lime rock in self-fluxing ore, will commence at a temperature probably as low as 200 degrees Fahr. The advantages of eliminating a portion of the carbon dioxide as quickly as possible and as high up in the furnace as possible to carry out a minimum of heat units are apparent. None of these advantages can be obtained without a relatively larger stock line diameter than generally is employed.

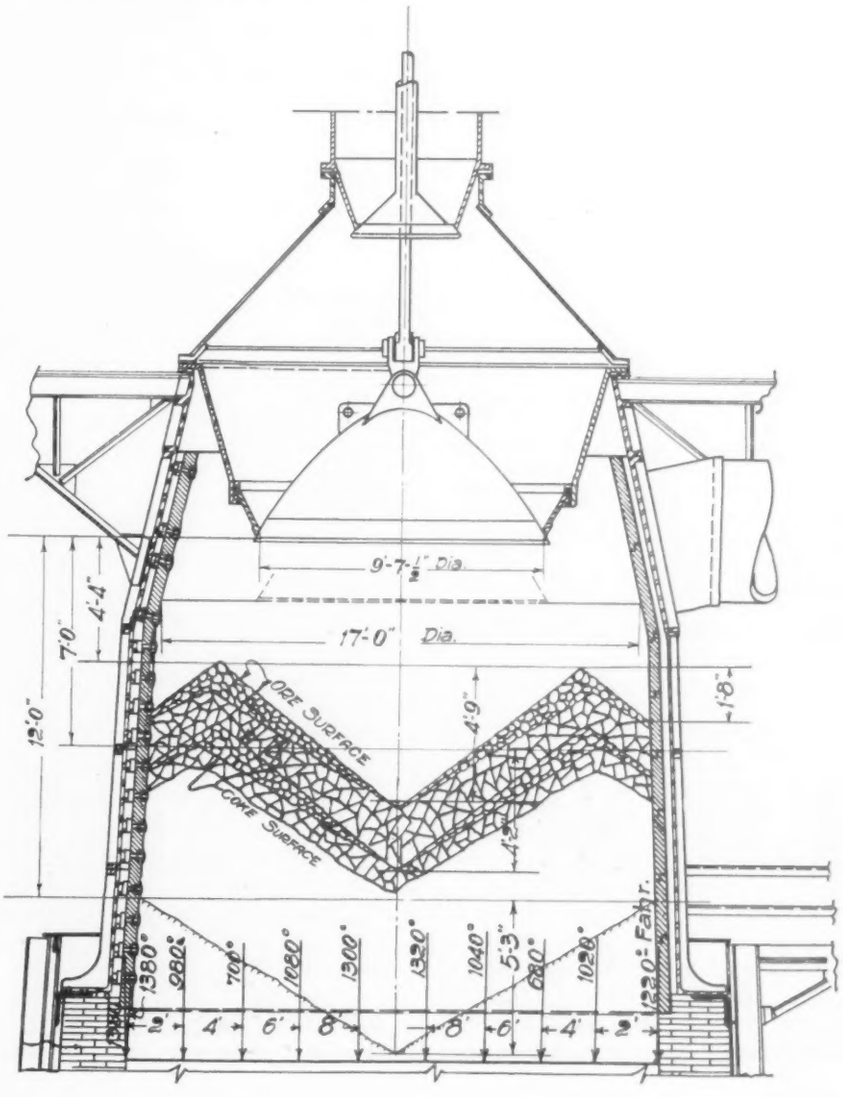
Enlarge Diameter

Correct stock distribution is one thing; the way to obtain it is another. Nevertheless, periphery of ore charge should reach hearth and bosh in its hottest zone, which is on about the same diameter as the tuyeres, increasing upward through the bosh section. Thus there is a direct relationship between periphery of ore charge and diameter at tuyeres. This is an essential point and is one of the first things to be considered when designing a new job or changing an existing furnace. Majority of existing blast furnaces can be corrected by increasing stock line diameter.

Advantages of recrushing hard ores has been thoroughly demonstrated but this is found to have a direct effect on distribution. Recrushing of Southern red ore produces additional fines which in turn tend to aggravate the scabbing condition previously mentioned. It is believed this condition can be met only by increasing the stock line diameter as compared to bell diameter and by charging the ore so coke charge completely envelopes ore charge, thereby sealing the fines away from the wall.

It should be noted that charging the furnace according to these principles would be disastrous to the inwall unless it was thoroughly protected by an adequate inwall cooling system as no brick could be expected to withstand the temperature to which it will be exposed and as the gases are destructive to brick at critical temperatures.

There are two well-defined temperatures which are destructive. One is the temperature at which brick will fuse. The other is a temperature or condition which causes brick to disintegrate. This takes place from the mantle upward to a point where the temperature would not be over 700 or 800 degrees Fahr. Therefore, the wall must be held at a temperature below fusion point of the brick by an adequate cooling system which firmly supports the disintegrated brick during the period of self-replacement.



Section through blast furnace with furnace temperatures at bottom plane

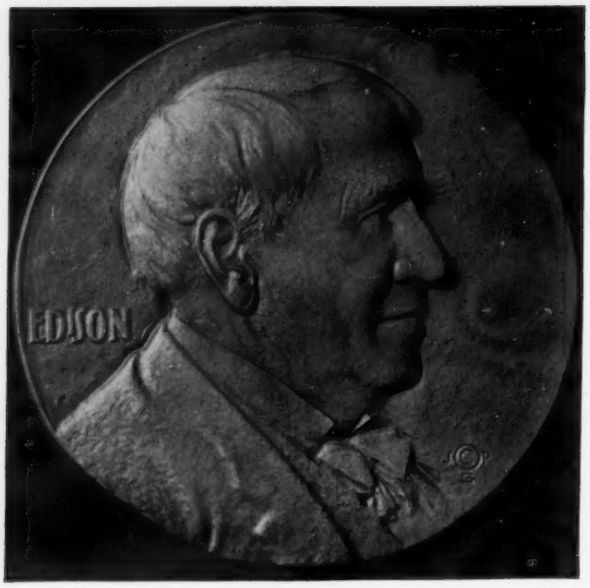
♦

New Instruments Check Tin Thickness Quickly

■ Technical Publications Series A, No. 66, published by International Tin Research and Development Council, 149 Broadway, New York, describes measurement of the thickness of tin coatings on steel by a magnetic and an electromagnetic method.

Method of Bruce Chalmers and W. E. Hoare employs a cobalt chromium steel permanent magnet and measures force necessary to pull it off the sheet being tested using a syphon-operated water balance. Since a difference in thickness of 0.00005-inch in a coating of 0.0001-inch has been observed between points on the surface only 0.1-inch apart, it was desirable to develop an instrument for measuring thickness of coating virtually at a point. The instrument devised now measures a difference of thickness of approximately 0.000005-inch, five millionths of an inch.

The electromagnetic tester developed by W. H. Tait uses a small transformer placed on the sheet so non-magnetic coating forms gaps in magnetic circuit of core. The first instrument is particularly useful for plotting surface contours and the second device is primarily a workshop instrument for measuring average thickness and large scale variations.



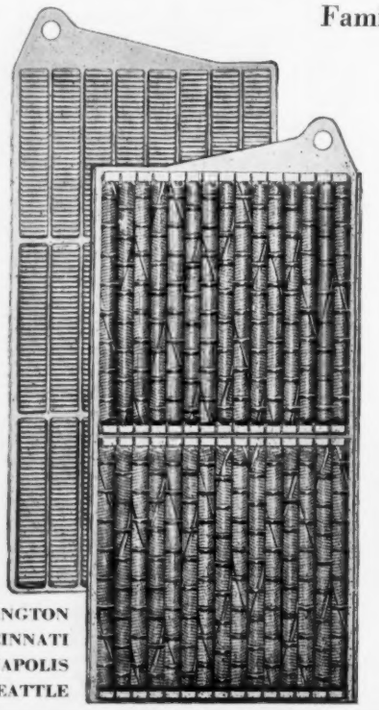
Volumetric Changes Worried Him . . .

When Thomas A. Edison, in 1898, initiated his search for the ideal industrial storage battery, he began by rejecting as impracticable all existing methods of storage battery construction. Hard rubber? "No! Too fragile," he said. Lead? "No! Too heavy for general industrial services," he objected.

One thing that worried him was the fact that active materials change volumetrically between charge and discharge. Something exceedingly strong yet expansible was needed to hold them in the plates. He solved the problem by using steel tubes and pockets for housing the active materials—held securely in the steel grids that are pictured here.

This steel storage battery goes into the steel industry to move steel and materials economically, efficiently. It is the preferred power unit in this industry. This also is true in all other industries where that versatile unit, the battery industrial truck, is proving its usefulness day in and day out.

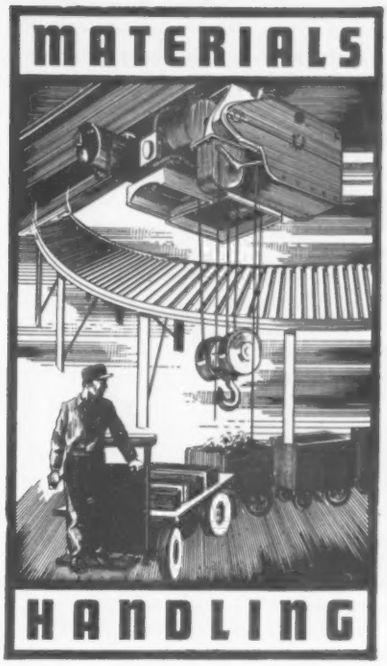
Familiarize yourself with the economies that can be effected with steel storage batteries applied to your material handling problem. Write or 'phone any of the district offices listed below.



EDISON STORAGE BATTERY

BOSTON NEW YORK PHILADELPHIA WASHINGTON
PITTSBURGH BUFFALO CLEVELAND CINCINNATI
CHICAGO DETROIT ST. LOUIS INDIANAPOLIS
DENVER SAN FRANCISCO SEATTLE

DIVISION OF THOMAS A. EDISON, INC.,
WEST ORANGE, NEW JERSEY • U. S. A.



Conveyor Carriers

Second part of this article details handling involved in heat treating work, the short fabricating and feeder lines, and final assembly. A unique trolley conveyor is used

PART II

■ HARDENING spring plates at Inland Mfg. Division of General Motors Corp. in Dayton, O., is done in a special controlled-atmosphere furnace of the continuous type. Cold end of hardening furnace is maintained at 1350 degrees Fahr. and maximum at delivery end is 1500 degrees Fahr. It requires 18 minutes for work to go through this hardening furnace. Loading end of this furnace is shown in Fig. 8.

Completes Oil Seal

Furnace is a roller-hearth type equipped with a vertical chute at the delivery end which completes an oil seal. Work falls to the bottom of quench tank on a mesh belt conveyor whose speed is controlled to eliminate interference in the quenching media. The disks are conveyed and automatically transferred to a second mesh belt comprising the degreasing unit. Disks now test between 62 and 65 Rockwell C and are uniformly hard.

After the degreasing treatment disks are placed in a vertical rack constructed to accommodate and evenly space 62 pieces. These racks are a part of the preliminary-draw-furnace conveyor chain. An iron pipe is placed through the central hole of the 62 disks in each rack prior to furnace entry to facilitate handling after treatment.

Work is heated to 780 degrees Fahr. and requires 1 hour to pass through the preliminary draw operation. After treatment the disks are automatically water quenched or air cooled for subsequent handling. Disks now have a hardness from 45 to 48 Rockwell C. The 62 pieces, mounted on a pipe fixture, are removed from the quench with a hoist and transferred to the final set and tempering furnace fixture which holds 32 pieces. Work then is picked up by hoist, placed in position on the ram feeding the set furnace which is similar to the flattening furnace shown in Fig. 6.

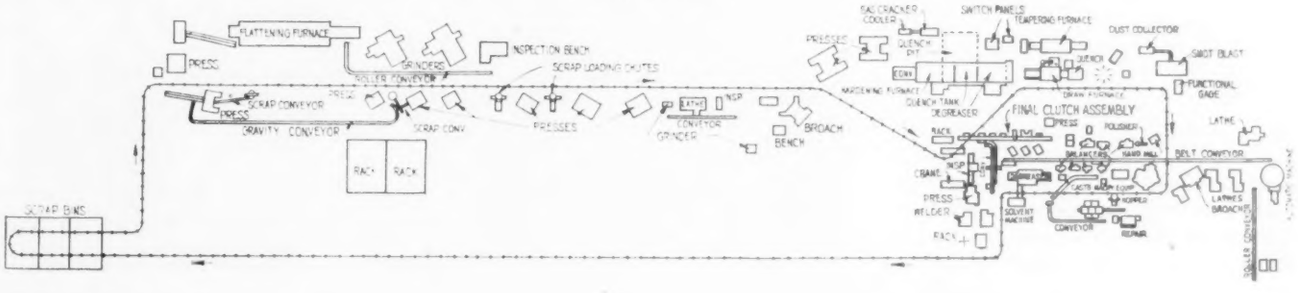
In the final set and tempering furnace, spring plates are held at 870 degrees under 1000 pounds per square inch pressure for six hours although it takes nine hours to pass completely through the furnace operation. The plates test 43 to 45 Rockwell C at this point. Next with the aid of a hoist, fixture is removed and placed on a knock-out device which removes plates from the fixture directly on to a special rack. Plates now are tested for hardness and placed on the sixth shelf of the trolley conveyor. When work reaches the shot blast machine the operator removes the plates from the sixth shelf, shot blasts them, and places them on an inspection bench.

Special Setup

Here they are tested on a special setup which gives an accurate measure of their flexing characteristics. Each piece is individually set in a power press, overflexed 15 times during which it travels from its cone shaped position to a flatter shape. Disks are placed in a load testing machine to determine load characteristic at various positions and must conform to certain limits. These tests are arranged to give an accurate measure of the reaction characteristics of these spring plates and limits are quite critical as entire operation of clutch depends upon this part. After checking, pieces are placed on tenth shelf of the trolley conveyor.

At the special assembly conveyor line shown in Fig. 9, plates removed

Fig. 7—Layout diagram showing arrangement of trolley conveyor line, feeder lines, heat treating equipment and machine tools in clutch fabricating plant



from tenth shelf are given a coat of lubricant and assembled with other parts to form a complete clutch assembly as is detailed later.

Clutch cover plates are made from SAE 1010 stock as follows: Sheet steel is fed from a stack onto conveyor, through an oiler and into a press where the pieces are blanked and drawn, six pieces being obtained per strip. With the blanking operation, scrap cutters on the press cut up the skeleton, which remains, permitting scrap to be blown out back of press. The trolley conveyor holds a bank of material and carries the work between operations which involve a restrike, emboss, pierce and trim with additional

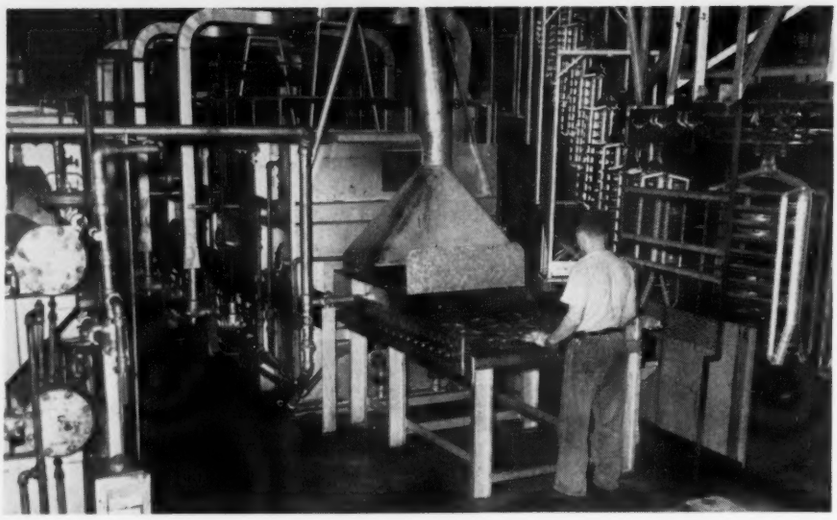


Fig. 8—Loading end of continuous roller-hearth hardening furnace. Plates are taken from shelves on trolley conveyor through opening in shield at operator's right

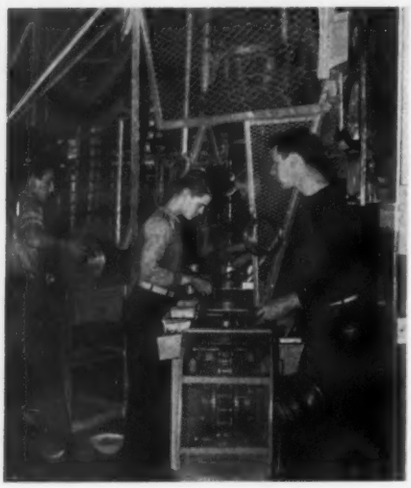


Fig. 9—Start of final clutch assembly line which passes underneath trolley conveyor seen at left and above in this view

piercing operations for various other holes on cover plate.

After piercing, work is flanged on the inside diameter and flattened. Flanged bosses and pivot ring seat next are faced on special grinders. After inspection of each plate, 24 holes are reamed and three drive lug slots are broached on a three-way broaching machine. Burrs are removed on a lapping block, work is blown off with air and hung on a conveyor passing through a degreaser. From the degreaser, burrs on drive slots and holes are filed by hand and covers are placed in a storage bank ahead of the spring and cover assembly.

Cast iron pressure plates are received from the foundry with a hardness of 187 to 229 brinell. Each piece is individually checked for hardness on a special bench tester from which it goes on a gravity conveyor to automatic machining operations involving facing, turning ¼-inch radius and also the outside diameter. From this machine, work goes on a belt conveyor to a lathe where other surfaces are faced. Three drive lugs now are broached and piece is drilled, tapped and milled on a 5-stage automatic machine after which it is polished, balanced, inspected and sent to assembly line in Figs. 9 and 10. During these operations work is handled on a multiple-deck belt conveyor. Scrap produced falls to bottom of machines onto a bucket conveyor which elevates it and dumps into chutes feeding hoppers which in turn dump into buckets on the trolley conveyor carriers.

On a separate short fabricating line, pivot rings are made from wire coils. Rings first are formed on a ring machine, cut to size and ends pressure butt welded, after which each ring is checked to measure strength of weld. Next the rings are sized, embossed, flash coined, load tested for parallelism, and inspected. Rings then are transferred to a pipe rack ready for assembly with other parts.

Handles Nine Studs

Assembly of spring and cover parts is handled on the line shown in Figs. 9 and 10. At first stage, immediate foreground of Fig. 9 operator takes nine studs from bin, places them in a fixture on the assembly conveyor, places pivot ring and assembles three washers over three of the studs.

At second stage, operator re-

(*Please turn to Page* 70)

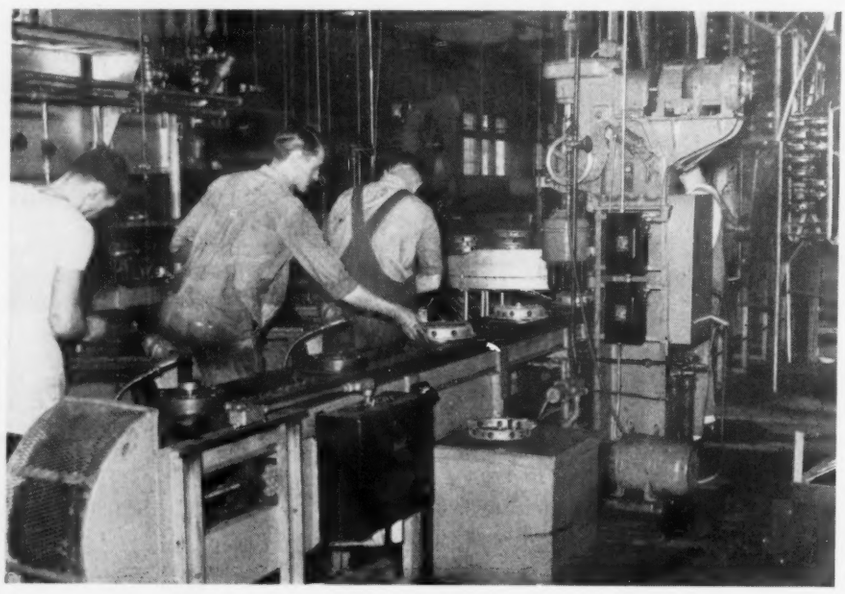


Fig. 10—Other end of final clutch assembly. Here operators remove assembled units from conveyor and set up nuts with power wrenches

Flameproofing—An Inexpensive Process

■ CONTRARY to the usual belief, flameproofing is not complicated or costly. It is a simple chemical process that will reduce many industrial fire hazards. Although flameproofing in no case renders materials absolutely fireproof, it is valuable as it retards the action of the flame, slows up a fire, permits people to escape and lessens the amount of damage done before fire-fighting equipment can be brought into action.

Materials properly treated will resist the action of flames for long periods. Flames of sufficient intensity and duration will eventually char treated material but the material itself will not break out into flame. This is what is generally termed "flameproofing." It has been common practice for some time to flameproof cloth, paper and wood used in theaters and other public buildings as this requirement is generally encountered in all large cities. Many fire hazards in industry could be reduced or eliminated easily.

Two Compounds

Flameproofing compounds may be divided into two general classes according to the manner in which they act. One type, when heated, forms a salt crustation which seals the surface and prevents the escape of gases to support combustion. This group includes boraxes and silicates. Chemicals in the other group when heated liberate an inert gas which crowds oxygen from the surface of the material so combustion is unsupported. Typical of this group are the ammoniacal salts.

Usual method of application consists in painting or spraying the surface with a solution of flameproofing compounds. Heavy porous articles such as timbers are subjected to a more elaborate process involving removal of air from the cells by vacuum and impregnation with flameproofing material under hydraulic pressure.

Since most flameproofing materials are removed by washing or action of the weather the surfaces of treated materials should be waterproofed if they are to be washed or exposed to the weather. This can be effectively accomplished in many cases by painting after flameproofing. Painted fabrics, however, crack when flexed permitting the flameproofing material to be rinsed out by water with a resulting decrease in effectiveness. This necessitates care to prevent flexing sufficient to cause cracks in the paint or else the fabric is left unpainted and the flameproofing renewed whenever it is washed.

Many Applications

Protection afforded by flameproofing has been found valuable on a wide range of applications. Applied to canvas, it makes screens or shields that prevent sparks from blowing about when welding equipment is in use. Leggings, gloves, hats and other articles of clothing can be flameproofed to protect welders, foundrymen, drop-forgers, steel workers and others exposed to fire hazards.

Canvas ducts of ventilating and dust collecting systems and all cloth or fiberboard used in boiler rooms should be flameproofed. Machinery covers, dust filter panels, window and door curtains, vacuum cleaner bags, cardboard and paper storage files, paper and cloth signs, fiberboard and plywood partitions, workbenches—these and many other potential hazards can be converted easily from fire spreaders to fire checkers.

In addition to the practice of flameproofing materials themselves, it is often advantageous to protect untreated articles or locations of potential hazard by using flameproofed cloth, wood panels or fiberboard as covers or shields. A study will reveal many other applications.

From an article by E. L. Johnson in the *American Mutual Magazine* published by the American Mutual Liability Insurance Co., Boston.

Should Friction Be Used or Not?

■ WHILE FRICTION is necessary for the operation of some types of power drives, it is quite detrimental and expensive in other cases. Belts, pulleys and so-called friction drives depend upon friction for their operation. In such drives, oil or other lubricants are a detriment in that they reduce the friction and hence effectiveness of the drive.

Increased pulling power of special types of belts, if required for successful operation of the drive, pay for the higher original cost by increased output or decreased maintenance. In some cases a higher first cost of 25 per cent has increased hourly production and also provided more than double life compared to the cheaper belt.

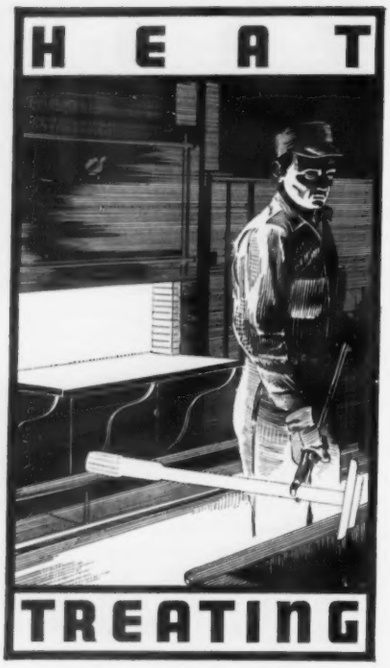
The same characteristic which causes oils and greases to reduce friction and which interferes with effectiveness of friction drives makes possible the operation of bearings and other metal surfaces in rolling contact with low loss.

In addition to decreasing bearing friction, lubricants properly applied and with correctly designed housings, prevent entrance of dust which not only has no lubricating value but which also may cut into bearing surfaces and increase friction.

Proper selection of type and consistency of a grease often permits satisfactory operation of many bearings which are too open to retain oil. In such cases bearings usually are pressure lubricated. Pressure of fresh grease pushes out used lubricant which forms seals at ends of bearing and aids in excluding dust. Such seals are fairly satisfactory at moderate speeds where dust content of surrounding air is not too great. For high speeds and dusty atmospheres closer-fitting plain bearings or sealed antifriction bearings are necessary to prevent excessive wear, maintenance and friction losses.

Slippage Reduced

■ **Increasing popularity of the Phillips recessed-head screw for automobile garnish molding assemblies was mentioned some months ago in STEEL. Here is a closeup showing the application of this screw to a Packard garnish molding. The screw is chromeplated hardened steel, 1⅛ inches long, with a No. 6 head. Note the special type of driver which fits securely into the X-shaped recess in the screw head, minimizing tendency to slip off and mar the finished molding. The screw is supplied by American Screw Co., Providence, R. I., and its licensees**



Wire Metallography

Study of steel microstructure prior to drawing offers key ending mill troubles and assures uniform high quality. Grain control should start with original heat

By B. L. McCARTHY
Chief Metallurgist
Wickwire Spencer Steel Co.
New York

■ SINCE THE discovery of iron, variables in chemical composition and heat treatment have made it difficult to duplicate at will certain exceptional physical properties which occasionaly revealed themselves. These variables are with us yet although the high perfection of chemical analysis has resulted in greatly reducing differences in chemical composition. However, influences of minute traces of impurities, some known and some unknown, still present a problem.

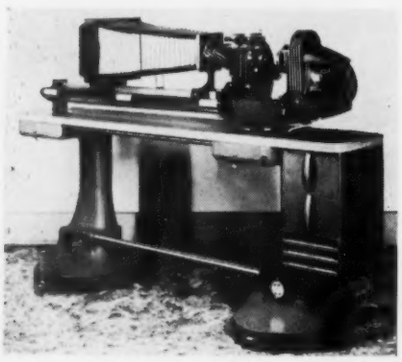


Fig. 1—Latest research metallographic equipment

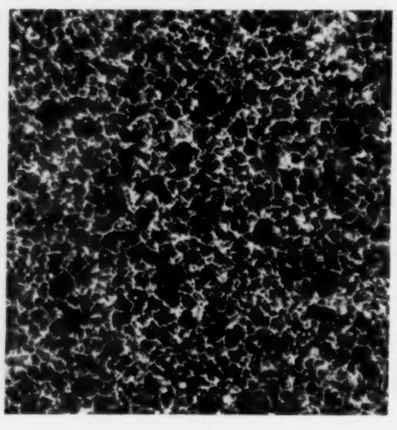
Study of metal microstructure has provided metal workers with a tool to better control properties resulting from heat treatment. With the microscope, properties of metals can be predicted. By combining with a knowledge of treatment and composition required to produce desired microstructure, properties wanted can be developed in the metal. Today, the metallographic microscope is capable of extreme magnification, has such special features as light and dark field illumination, polarized light, and binocular eyepieces. Shock absorbers eliminate vibration and simplify high-magnification photography. Research is extended. Scope and sensitivity of process control is increased.

Recent Move

Application of metallography to wire manufacture is comparatively recent. Instead of depending upon rule-of-thumb methods, microstructure of the material, prior to application of cold work, is controlled. These developments have been found the answer to many troubles heretofore believed inherent in wire mill operation. Now it has been established that high-carbon wire and rod must have a definite microstructure, further, that the steel itself from which the wire or rod is made must have certain inherent characteristics. Costly manipulation of patenting furnace temperature and take-up block speed, which at best can only take care of a small amount of variation, are eliminated if the correct steel is employed.

Prior to use of McQuaid Ehn grain size test to gage quality of steel intended for the wire mill, steels showing a wide variation in grain size were common. Modern practice is to use a uniform coarse-grained steel for manufacture of cold-drawn high-carbon wire. Further study of behavior of different heats of steel intended for manufacture of wire has shown that treatments other than the McQuaid Ehn grain size treatment can bring out in the microstructure characteristics which influence quality of wire produced. This refers to the pearlitic structure produced in patenting. Microstructure study of high-

Fig. 2—Fine grain steel, size No. 7 by McQuaid Ehn test, at 100 diameters



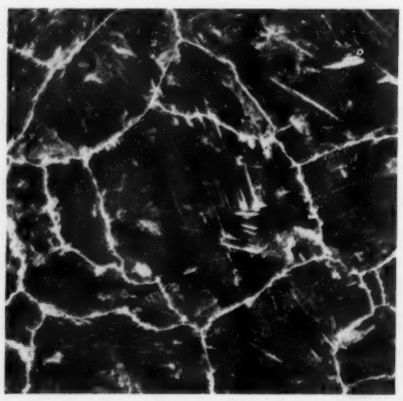
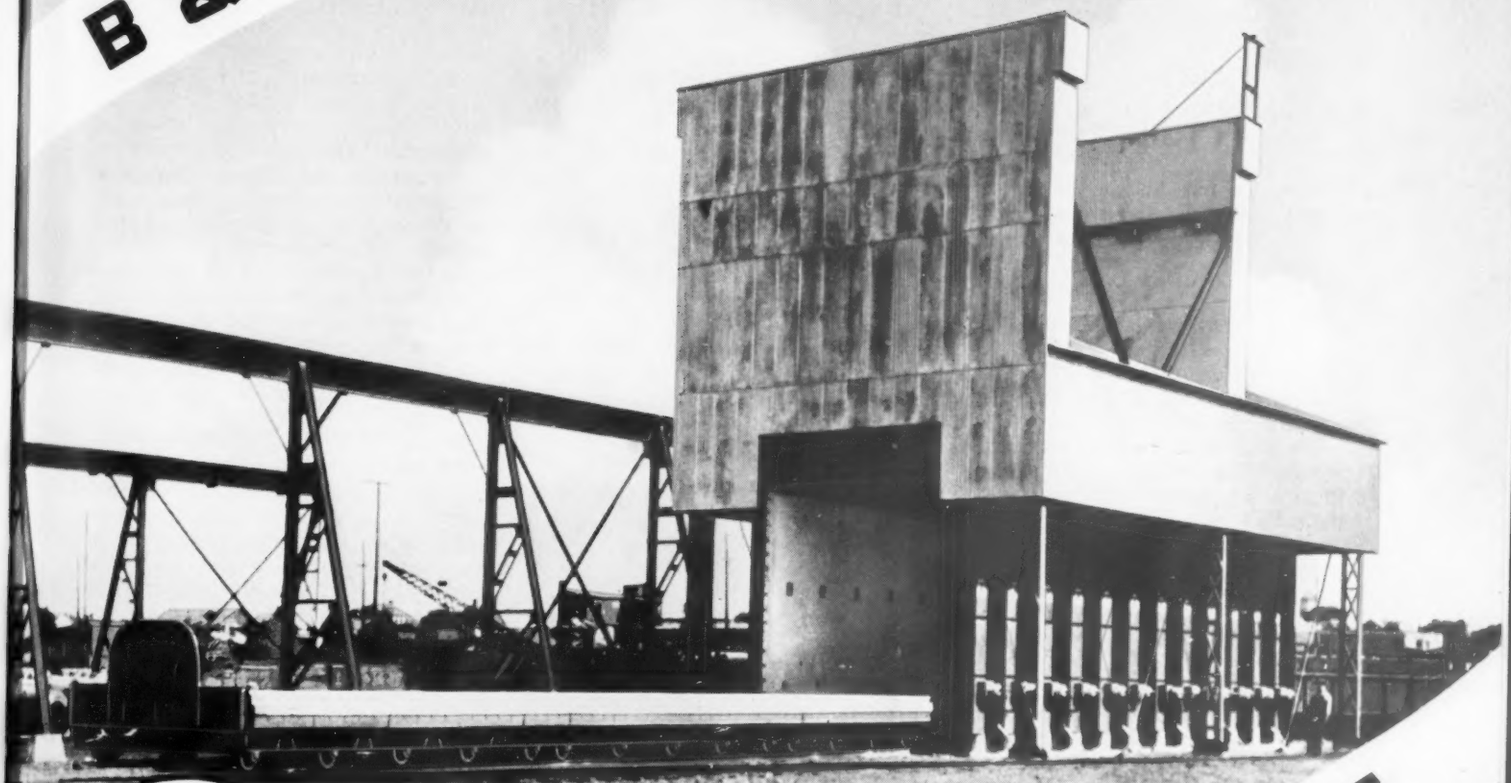


Fig. 3—Coarse grain steel, size No. 2 by McQuaid Ehn test, at 100 diameters

B & W INSULATING FIREBRICK



Pioneer STRESS-RELIEVING FURNACE

In constant service since 1931, stress-relieving and normalizing large welded pressure vessels and plates. Temperatures for these operations run from 1200 to 1650 F. Also, several heat-treating cycles have been run at 2000 F. No major repairs have been required.

write FOR BULLETIN R-2-E

THE BABCOCK & WILCOX COMPANY
REFRACTORIES DIVISION
19 RECTOR STREET NEW YORK, N. Y.

BABCOCK & WILCOX

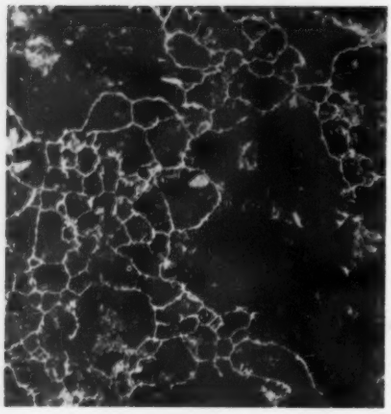


Fig. 4—Duplex type structure, mixed grain size steel, at 100 diameters

carbon patented material enables such important factors as type of charge, carbon content of bath at time of melting, slag condition, etc. to be regulated so subsequent heat treatment results in the microstructure desired prior to cold working.

McQuaid Ehn grain size studies as well as observations on amount and distribution of non-metallic inclusions can assist also in determining the proper deoxidation program.

Variations Occur

Micrographs showing variations from fine, Fig. 2, to coarse grain size, Fig. 3, can often be obtained in different heats of exactly identical chemical analysis. Since such steels respond differently to heat treatment, wide variations in quality of wire produced under a given condition results, a fact not known until recent years. Some wire mills today do not recognize the value of controlled grain size of steel to be drawn into wire, yet the underlying principles are sound and readily demonstrate their value. Where maximum efficiency and a uniform run of high quality is desired, best results are obtained with coarse-grained material.

Average run of heats in the past did not show extreme differences in grain size from heat to heat but revealed mixed areas of coarse and fine grains, as well as duplex structures. From a wire manufacturing standpoint, the duplex structure, Fig. 4, presents more of a problem than uniform fine grain steel as shown in Fig. 3. The reason is the patenting treatment cannot be adjusted to take care of fine and coarse grain cases in the same rod or wire. Resulting variation in rate of reaction in the two areas produces a variation in microstructure which in turn influences wire quality.

Beyond the network structure revealed in grain size tests there is another story which involves the nature of the plate-like structure called pearlite as compared with tendency of other steels towards the coalscences of cementite particles and a delayed development.

This behavior of iron carbide at time of precipitation can influence structure of patented rod or wire and seriously change quality of wire being produced. Figs. 5 and 6 show two structures, both of which are pearlitic. Yet it is obvious there is a wide variation in plate thickness. Fig. 5 shows areas with a tendency towards formation of rounded particles of iron carbide rather than thin continuous plates. While thickness of cementite plates depends largely on rate of cooling, fine grain areas can produce thicker plates than coarse grain areas with same rate of cooling. When both these conditions are present in the same piece, a degree of non-uniformity of strain distribution can exist in the finished wire which impairs quality.

Often the patenting furnace pyrometer does not truly indicate influence of heat on material being treated. There may be a number of causes. Wires running together can, because of mass influence, be heated less than an adjoining wire running separate. Microstructure analysis readily detects these conditions so necessary corrections can be made.

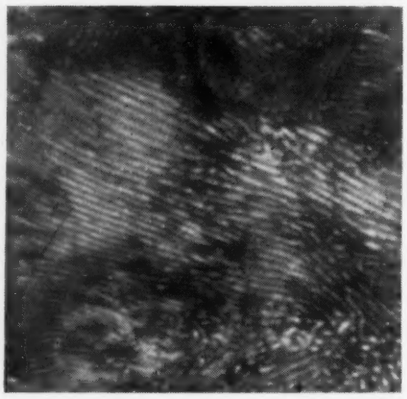
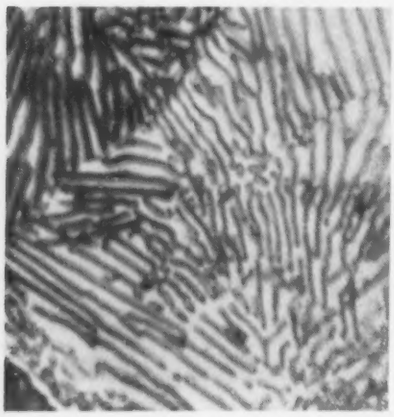


Fig. 6—Medium pearlite at 2500 diameters

Fig. 5—Coarse pearlite, magnification 2500 diameters



Structure of patented wire or rod, formerly regarded as sorbitic, with greater resolving power of modern equipment is found to consist of thin plates of ferrite and cementite. The term sorbite implies presence of rounded particles of cementite, yet it has been found that the best condition of iron carbide for wire drawing is the plate-like formation. This indicates that while we undoubtedly had the same structure in both cases lack of sufficient resolving power failed to reveal true structure characteristics.

No small part of this development in microphotography is due to improvements in preparation of the sample. It is important that proper care be exercised both in polishing and etching to produce a specimen with markings as clear as possible. Even at low magnifications, improvement in polishing and etching technique is noticeable.

Annealing Important

In making low-carbon wire, annealing is important. Usual temperature is 1300 degrees Fahr. Here again the pyrometer only reveals furnace temperature and does not show the influence of temperature on the wire itself. In pot annealing, it is not uncommon to find wide grain structure variations between outside and inside of same coil. Variations can exist in the finished wire which cause trouble if wire is subsequently formed.

Difference in temperature between center and outside of pot causes outside of coil to come up to heat quicker and to soak longer than the center, resulting in these variations. This always is a problem in pot annealing and the microscope has been helpful not only in detecting the reason for these variations but as a guide in design of suitable heating equipment.

Figs. 7 and 8 are micrographs taken from different places on the same coil of low-carbon wire. Fig.

Fig. 7—Annealed low-carbon wire, heated too high, at 2000 diameters

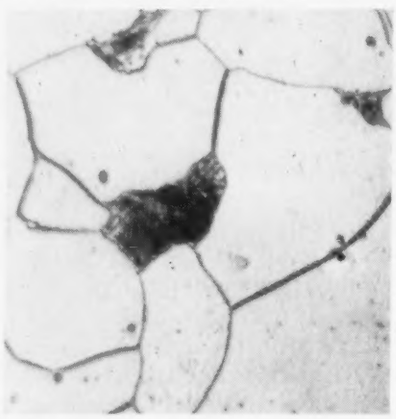


Fig. 8—Annealed low-carbon wire, heated properly, showing globular cementite, at 2000 diameters

7 shows Lamellar structure of pearlite in the black areas taken from a sample near the outside of the coil which has been heated above the critical point. Fig. 8 shows spheroidized particles of globular cementite in properly heated wire near center of coil.

Behavior of rimmed steels under conditions of annealing is important and wide variations in grain size may result. Tendency of grains in rim of rimmed steels to grow has been widely studied and while it is important in making round wire it is vastly more important in strip steels intended for deep drawing purposes.

Heating for Valve Springs

Heat treatment of oil tempered spring wire for valve springs and other purposes begins with heating above its thermal critical range. Then it is quenched in oil and tempered in a molten lead bath. The austenitic grain size developed in the first heating greatly influences fatigue properties of springs made from such material. It is essential that speeds and temperature be regulated to produce minimum austenitic grain size. A special reagent readily brings out grain size in the quenched wire.

Since oil tempering is a continuous process, the same as patenting, grain structure analysis is valuable in definitely establishing influence of heat on the material. Structure of material in the as-quenched condition other than austenitic grain size is important and can be brought out by etching with a weak solution of nitric acid in alcohol.

Details of wire metallography such as duplication of samples, studies in galvanizing, control of heat treatments and of melting practices present numerous opportunities for interesting and instructive study and much remains to be done along these lines.

Induction Hardening Cuts Distortion in Worm Gears

■ Difficulty chiefly experienced in hardening worm gears is the tendency of the worm to unwind due to heat stresses in the metal. In seeking to eliminate this trouble, Alma Motor Co., Alma, Mich., recently co-operated with Ohio Crankshaft Co., Cleveland, in making experiments using the Tocco process of induction hardening. The worm gears used by Alma Motor Co. are a special shape from which their name, Cone-type, is derived. Hardening of these special forms had involved some difficulties.

Several worms were hardened by the Tocco method with excellent results. Previously hardness of these gears, using S.A.E. 4640 steel, was limited to around 350 brinell as their form had to be corrected for errors introduced during heat treating. Now it is practical to obtain hardness values from 63 to 64 Rockwell as the distortion introduced by induction hardening amounts to only 0.0015 to 0.0020-inch whereas 0.0050-inch is permissible. Also there is very little tendency for the worm to unwind.

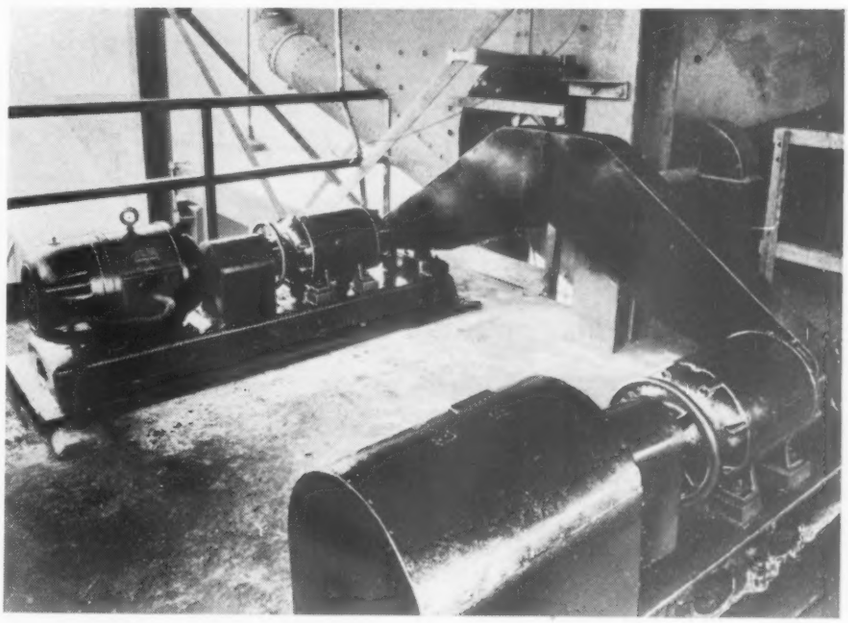
Load tests made on a dynamometer resulted in wrecking the dynamometer with the worm remaining unharmed. Other tests made under severe overloads show a significant increase in life of the gear reduction unit as it is possible to use a much harder pinion in conjunction with the induction-hardened worms, resulting in increased load-carrying capacity and length of service.

Heat-Resisting Springs

■ Of the newer materials, stainless steel is finding wide application in springs for use where moderately high temperatures are encountered. In particular, stainless steel springs are doing an excellent job on gas range valves. Practically all new-model ranges utilize enameled steel panels to completely enclose the valve mechanism, forming a very effective heat trap. Thus high temperatures are applied to the valves and springs. After considerable difficulty had been experienced with various types of springs, stainless steel was given a trial and has been found satisfactory. It retains its resiliency after long exposure to comparatively high temperatures. In all cases the temperature must be under 700 and preferably under 650 degrees Fahr.

Proper heat treatment is an essential step in the manufacture of stainless steel springs regardless of whether they are to be used for high temperature service or at ordinary room temperature.

Use Wide Speed Range



■ **Two of four JFS variable speed reducers driving coke feeders at a mid-western steel plant at speeds from 10 to 450 revolutions per minute using 10-horsepower motors. Feeders handle run-of-oven coke to rotary grizzlies in a screening station. Photo courtesy Stephens-Adamson Mfg. Co., Aurora, Ill.**

Plastic Coatings Applied to Pipes Automatically by New Process

By J. EDW. TUFFT

■ An automatic machine to apply plastic coatings to pipes has been used successfully on a number of applications in coating pipe line with a heavy layer of concrete to reinforce the pipe as well as protect it against corrosion. The life of pipe already fragile through corrosion has been extended by application of concrete covering with steel wire reinforcement. The coating is applied in the trench without disturbing the pipelines. The process also may be used in thermal insulation of industrial pipelines and in applying protective coatings on pipes where corrosive atmospheres prevail, as in pickling rooms, electroplating shops, etc.

Applied by Pressure

Invented by Thomas H. Wilson, the process is controlled by Sterling C. Lines, consulting engineer, South Spring street, Los Angeles. Experimental and development work has been carried on by Mr. Lines. In the new process, plastic material is applied by a rubbing pressure without the use of supports or forms of any kind. The machine for this work consists of a light steel frame which rides along the pipe on equalizing dollies. A small gasoline engine mounts on this frame and rotates a drum that encircles the pipe. Concrete or other plastic is fed into a hopper at top of a housing which encloses the rotating drum and feeds the plastic into the forward end of the drum. Steel fingers on the inside of the drum produce a screw action, kneading and applying the plastic firmly to the surface of the pipe.

The plastic is forced tightly against the pipe and against a starting ring fastened around the pipe at the point where application is begun. When the concrete has been packed to adequate tightness, screw action of the drum fingers extrudes the concrete and causes the machine to move along the pipe by the reacting thrust. Counterweights maintain the machine in an upright position on the pipe and spacing dollies permit both vertical and horizontal adjustment. In beginning a job, the starting ring must be bolted tightly to the pipe to receive the thrust of placement. This method of application requires that the plastic must be dense, uniform and tightly placed in order to sustain the traveling thrust of the machine, insuring a coating of good quality.

When applying concrete to pipelines, variations in lug and housing designs permit an encasement thickness from ⅝ to 2 inches or more. Weight of the entire machine for ordinary pipe sizes need not exceed 400 pounds. Speed of travel along the pipe ranges from 1 to 6 lineal feet per minute depending upon rate of feeding and size of pipe as well as thickness and consistency of the coating. As overall width of the machine is little more than the diameter of the pipe, small trenches can be employed in coating pipe in position. Normal speed under average conditions is: 6-inch pipe, 200 to 300 feet per hour; 24-inch, 24 to 60 feet per hour. Tests have indicated the value of generously thick coatings, ¾-inch on 3-inch pipe up to 2 inches on 18-inch pipe.

Placing concrete coating on pipeline with automatic, gas-engine driven machine

Enameled Steel Buildings Have High Salvage Value

■ Prof. R. M. King, technical director of the Porcelain Enamel institute in talking to Eastern Enameler's club at Baltimore, recently said, "Porcelain enamel on steel is aiding the architect with modern ideas to satisfy the public with a variety in form and color and to attain a maximum of magnificance with a minimum of material and money.

"First house finished in porcelain enamel was erected in Germany in 1895, but in Russia there is a church with porcelain enameled panels in the doors which are reputed to be 300 years old.

"Trends in architecture, such as streamlining, functionalization, restyling, and prefabrication are forcing the use of new materials, and new methods. Porcelain enameled sheets can easily be used in buildings which have felt these modern influences," added Prof. King.

Methods of attachment are numerous, so the best suited design can be selected for a particular architectural problem. These methods of application are usually divided into—panels without auxiliary backing, veneered units of porcelain enameled panels cemented to plywood, or insulation, and masonry blocks faced with enameled panels.

Replacement of panels is usually easy and in case of building demolishment the salvage value is extremely high. Where dismantlement and re-erection are contemplated, salvage may be as high as 100 per cent. Cost is competitive, he pointed out.

Announces Salt Dispenser

■ Mine Safety Appliances Co., 230 N. Braddock, Pittsburgh, has devised a bakelite molded salt-tablet dispenser especially developed for use in industrial plants. It forms a convenient means of renewing salt lost by workers from excessive perspiration. It is water-proof, gives one tablet at a time and is easy to install. It can be used both indoors and outside.

ADVERTISING PAGES REMOVED

NEW METAL PRODUCTS

■ Designed to traverse deep swamps or sand wastes where transport conditions demand unusual clearance, effective power and good traction, a truck called the Marsh-Buggy has been placed on the mar-

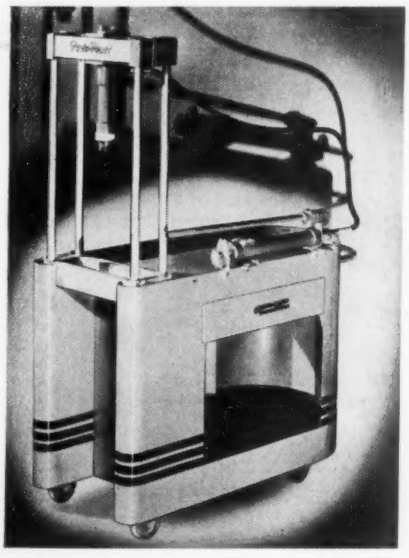
ket by Marmon-Harrington Co., Indianapolis.

Huge, 13.50 x 24 single tires are mounted front and rear, giving the truck positive traction and flotation. Instead of sinking into soft marshy ground, or sand, this new vehicle lies on top of it and rolls across. Truck is powered by a Ford 85-horsepower V-8 engine, converted to provide drive to all four wheels.

■ A new streamlined baby walker is the latest product of Gendron Wheel Co., subsidiary of American-National Co., Toledo, O. Each of the four little wheels has a tear-drop design fender. The product has band steel springs and chromium-plated hand rails to carry forward the latest in automotive and airplane design.

■ Steel's role in present day design is exemplified by the illustrated Porto-Power, a hydraulic repair machine for automobiles built by Blackhawk Mfg. Co., Chicago, and designed by Barnes & Reinecke, industrial designers.

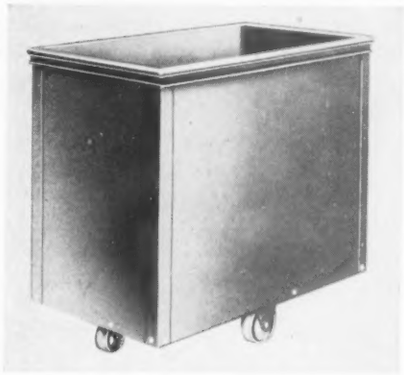
Heavy-gage strip steel is used for



the body of the machine, eliminating the black angle iron construction formerly used. The unit is finished in red and black. Additional features include easy-roll drawer, four chromium plated ram supports and a chromium plated push bar.

■ Constructed in two separate units, a heavy duty industrial box truck produced by Stackbin Corp., Providence, R. I., is designed to give maximum strength with minimum dead weight.

Chassis consists of a heavy channel steel frame, to which are bolted four casters. Body unit is constructed of 16-gage sheet steel sides and an inverted bottom of 14-gage steel. Bottom fits down over chassis so



that no bolts or rivets appear on inside. Body is encircled at top with a welded channel steel reinforcing section and a ⅝-inch bead. Truck is available in any required size.

■ A medium-spread aluminum floodlight, especially suitable for floodlighting service stations, yards, construction areas and other outdoor locations, has been introduced by Benjamin Electric Mfg. Co., Des Plaines, Ill.

Thoroughly weatherproof in construction, this unit has a reflecting surface which is processed to resist effects of heat, cold and dampness. Floodlight does not require glass cover for efficient performance in most instances, but such heat-resisting covers are avaliable. Unit is designed for use with 750, 1000 or 1500 watt lamps, and produces a symmetrical beam with a spread of 65 degrees.

■ A gasoline engine-driven shovel, that operates equally well as a clamshell, dragline or crane, has been announced by Lima Locomotive Works, Lima, O. Machine is a ¾-yard shovel, weighing 35,500 pounds, and, when equipped as a crane, has an 11-ton capacity. If used as a clamshell or dragline, machine's capacity depends upon length of boom and material to be handled.

Although equipped with crawler truck, this machine can be transported over improved roads by

means of a special trailer. This fast type of travel cuts transportation time from one job to another and permits user to get more work done.

■ A wringer-washer designed for greater beauty and convenience of operation has been introduced by Blackstone Mfg. Co., Jamestown, N. Y.

Beading has been incorporated on the bullet-type tub in streamlined styling to give a low sleek interpretation, the beading being carried around wringer support column. The cover was redesigned and the legs widened at top and vertically fluted.

The washer is of white porcelain enamel, the tub being triple-coated white porcelain inside and out. Wringer is finished in satin chromium. Safety wringer pressure control and triple washing action are among the other features. Designing was by Edward Blazey, Designers for Industry Inc., Cleveland.

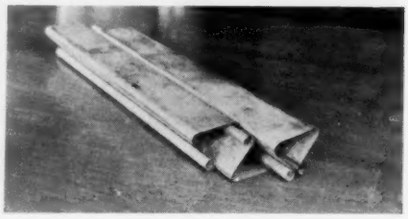
Will This Truss Prove a New Outlet for Flat-Rolled Steel?

■ A PRACTICAL solution to the national highway problem is the construction of truck highways on branch line railroads, according to William R. Malone, 106 East Locust street, Clearfield, Pa., of the staff of the Pennsylvania department of highways. Subsidized by federal and state funds, they would be operated by the railroads as freight toll roads, on a tonnage revenue refund basis.

Says It's Practical

The idea is practical even on main line railroads, in Mr. Malone's opinion. With proper traffic control, dual locomotive long-haul and truck short-haul freight traffic would be possible on the same right of way. To make this possible there is required a flexible truck highway base between and alongside tracks which can be removed for resurfacing the roadway and then replaced.

For such roadways Mr. Malone has developed and patented a new type truss made from light-gage, flat-rolled steel. Shown in the accompanying illustration, it is a narrow, triangular section with rolled edges for greater strength. These sections slide into each other to form a flexible steel truss which could be assembled on the job,



Miniature, triangular section of light-gage, flat-rolled steel truss with rolled edges for greater strength

placed between and alongside the rails and covered with suitable wearing surface material, thus forming a complete truck highway. If necessary, it could be dismantled, taken to some other location and reassembled with no loss of original material.

Due to Old Principle

Past failures with steel highways, says Mr. Malone, have resulted from employment of the conventional solid-mass principle of road construction. In any type construction, life of the highway depends on the subgrade beneath it and on proper drainage. The new steel truss, if adequately rustproofed, permits free drainage and should not deteriorate as a subgrade.

Other suggested uses for the new truss are: Bridge floors; wall panel sections and floors for residences and other buildings; sidewalks and driveways of all kinds; airplane runways at airports; floors for single and multiple-deck parking areas.

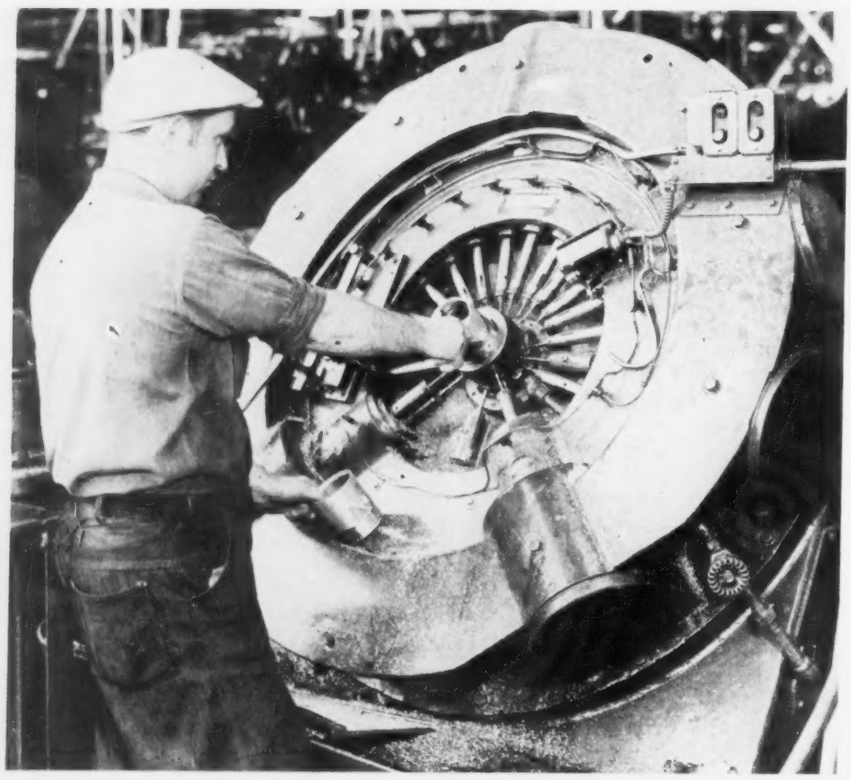
Bulldozer Loads Coal

■ A 15-ton tractor and bulldozer recently were utilized to extend the piling area for steam coal at the Bethlehem, Pa., plant of Bethlehem Steel Co. With the aid of a platform, the bulldozer also is used to reload the coal for consumption. The bulldozer, long standard equipment in earth moving, does the work at low cost, it is said.

With the aid of a platform, tractor powered bulldozer loads 80 tons of coal per hour. Photo courtesy Bethlehem Steel Co.

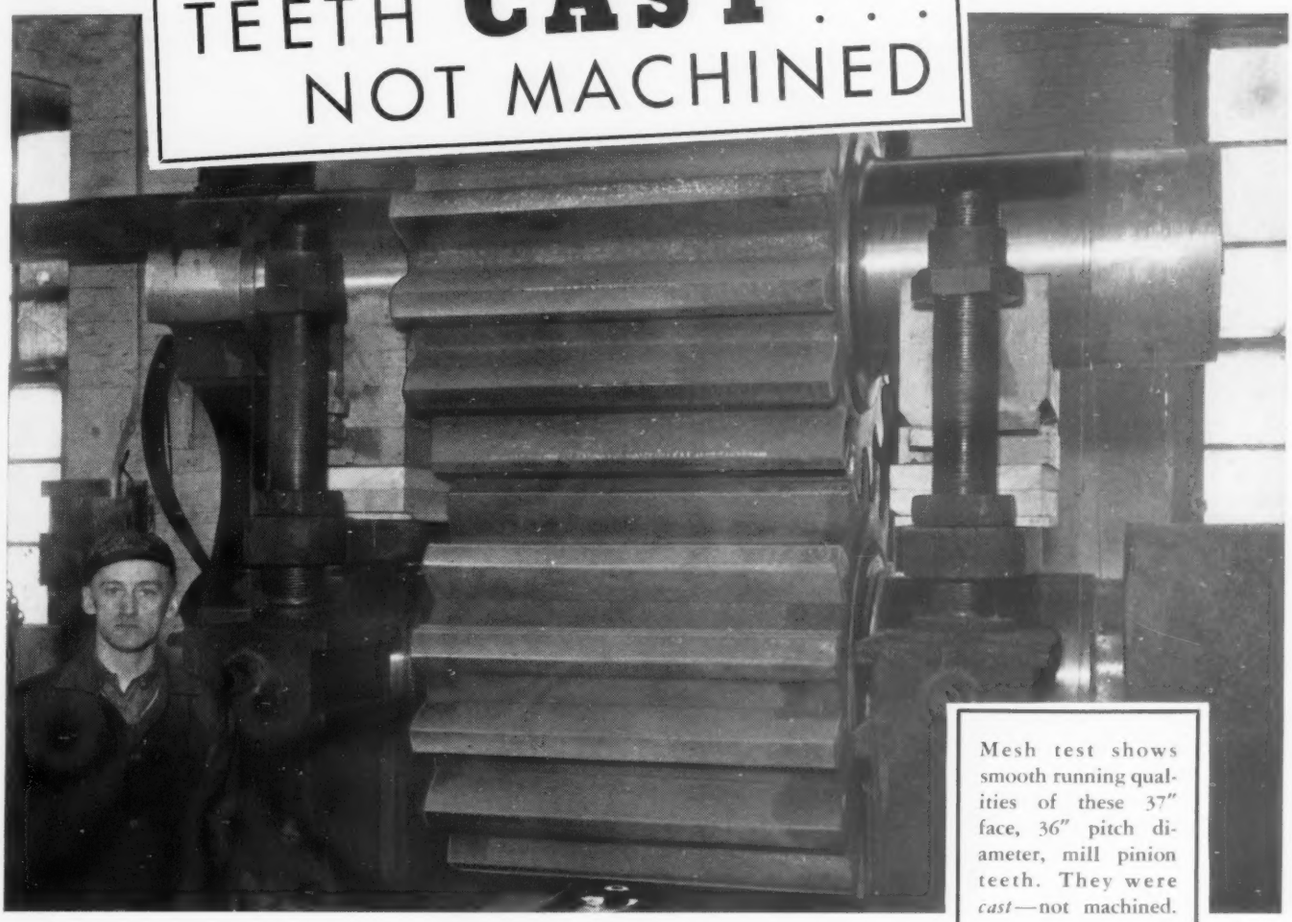
While this unit has been chiefly utilized in handling barley-size anthracite which is the Bethlehem plant's main source of steam coal, experience has indicated that it can be applied to piling coking-size bituminous coal with equal efficiency. Under average conditions, the bulldozer is capable of piling or loading barley-size anthracite at a rate of about 80 tons per hour.

Tilting Reduces Effort



■ **Tilting this automatic piston drilling machine almost to a vertical position greatly reduces the effort of the operator in loading the unit, as compared with the former horizontal position of such machines. The equipment drills 19 holes in the aluminum piston—15 oil holes and four slot holes; it is one of a battery in a plant of the Chrysler Corp., Detroit**

TEETH **CAST** . . . NOT MACHINED



Mesh test shows smooth running qualities of these 37″ face, 36″ pitch diameter, mill pinion teeth. They were *cast*—not machined.

BIRDSBORO *Saves* Large Rolling Mill $2,000 on Mill Pinion Fabrication

Yes! Birdsboro's Randupson Process of Precision Casting saved $1,000 on each of these two 16,600 pound, nickel-steel, mill pinions. Cast to a tolerance of 1/64″ on a tooth side, the 37″ teeth tested absolutely straight. Because it is not necessary to machine off the denser, wear-resistant skin metal, these teeth will give longer service.

Impossible four short years ago, such unusually true-to-pattern castings are setting new standards of casting accuracy — standards that are saving Birdsboro customers thousands of dollars in fabricating and assembly costs. Made by precision methods with cement-bonded molds, these Birdsboro R-P Castings even look different. Surfaces are smooth — free of pin holes, fins, or nail heads. In machining, there are no sand inclusions to dull or break tools. In service, their sound, uniform metal structure gives added security and longer life.

If you have a precision problem in heavy castings—put it up to Birdsboro.

STEEL CASTINGS • STEEL MILL EQUIPMENT • HYDRAULIC MACHINERY • SPECIAL MACHINERY • CRUSHING MACHINERY • STEEL AND CHILL ROLLS

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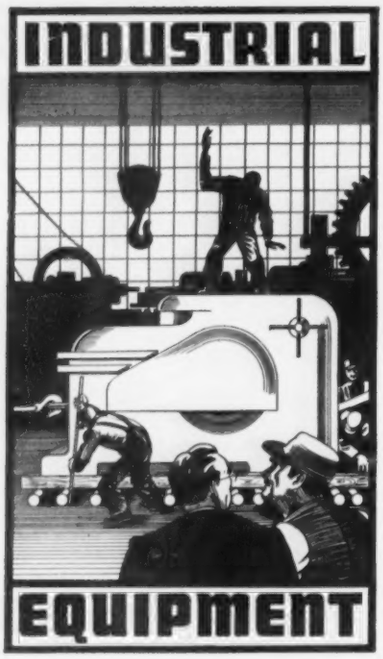
PLANTS AT BIRDSBORO AND READING, PENNSYLVANIA



Multi-Driller Indexes Mechanically

■ National Automatic Tool Co., Richmond, Ind., has introduced two station type multi-drillers and tappers, which perform a total of one hundred fifty-four drilling, countersinking, reaming, spotfacing and tapping operations on automotive cylinder heads.

One operator is required for each machine, and each maintains a production rate of ninety cylinder heads per hour. Machine illustrated has four horizontal and two vertical drilling units, and has both horizontal and vertical reversing motor drive individual lead screw tapping units. Drilling units are arranged with spindle boxes containing sixty-two bearing-mounted spindles with nose adjustment. Spindle boxes of tapping units contain thirteen spindles with individual lead screws and tap holders.

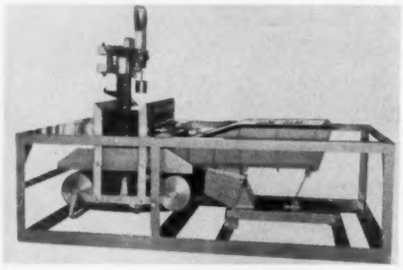
Cylinder heads are held in six identical stationary type fixtures, mounted around six-position automatic rotating table. As cylinder heads are mechanically indexed from one position to another, seventy-five operations are performed.

Machine Feeds Materials by Weight

■ Syntron Co., 370 Lexington avenue, Homer City, Pa., has developed an automatic, continuous weigh feeder, designed to provide a steady flow of bulk materials, such as coal and dry chemicals, by weight per hour to a constant, close accuracy.

Machine is made up of a vibratory feeder conveyor discharging onto a constant feed belt conveyor suspended from a scale having sensitive electric valves. Constant load is maintained on conveyor by ability of vibratory feeder to speed up or slow down its discharge as controlled by electric valves, which function at the slightest underweight or over-weight movement of the scale beam.

Vibratory feeder is of the pulsating, electro-magnet type, conveying bulk material by vibration, so it flows like water. Machines ranging in capacity from 25 pounds to 25 tons per hour are available.



Fitting Prevents Over-Lubrication

■ Keystone Lubricating Co., Philadelphia, has introduced a fitting, which makes virtually impossible the overloading of antifriction bearings through high pressure lubrication.

Device is used in connection with grease cup or high pressure fitting, at the bearing, and not only insures against hazards of uncontrolled lubrication but also prevents waste of lubricants. Fitting operates on principle of molecular friction and introduces lubricant to the bearing through a central duct. When pressure at bearing reaches 2½ ounces per square inch, back pressure forces lubricant past a calibrated orifice in base of the fitting and out through relief ports at the side. As soon as excess grease appears at these relief ports, it is a definite signal that bearing is sufficiently lubricated.

This fitting, with orifice and relief ports calibrated for the 2½-ounce pressure, will operate through a wide range of lubricant densities. With modifications, it is adaptable for special applications where fitting must be located at a distance from the bearing.

Instrument Feature Simplifies Heat Control

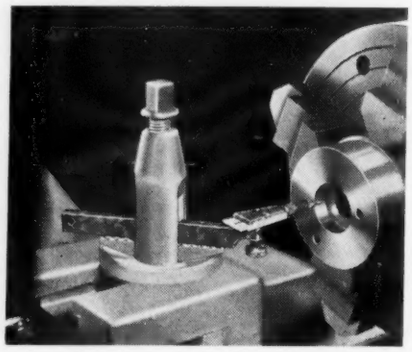
■ Taylor Instrument Co., Rochester, N. Y., has added a new feature, manual by-pass, to its Fulscope Micromax controller, thus enabling an operator to start his apparatus on hand control and cut in automatic control as operating temperature is reached.

When hand operation is required, manual by-pass enables operator to change the controlling-medium input at the instrument where its effects are recorded. Change-over from manual to automatic control is simple. An adjusting knob on the instrument sub-panel is turned to automatic, and a four-way air valve on the back of the panel connects air supply to the control mechanism. When the knob is turned to manual, the four-way valve connects the air supply directly to the diaphragm valve, by-passing the control mechanism. Another adjustment knob regulates air supply pressure, which is maintained at 25 pounds when on automatic control. Before changing over from automatic to manual control, output air pressure to diaphragm valve is observed, and air supply is reduced to that value. Thus, the control point is maintained.

Indicator Is Flexible

■ L. S. Starrett Co., Athol, Mass., has placed on the market a new indicator, known as the Universal Junior No. 564, which is outstanding because of the flexibility of its design.

Ball contact of this gage is frictionally held and may be set to



touch the work at any desired angle. Sleeve which holds contact point can be turned completely around, and the entire indicator can be swung through a full circle when mounted on the shank. This adaptability makes it possible to keep graduated scale in the most convenient position for easy reading; physical strain and eyestrain are eliminated, and double graduated scales or mirrors are unnecessary.

Indicator can be mounted on the side of one end of the shank or on top the other end when used in tool post of a lathe, or it can be removed from the shank and attached to the jaw of a height gage. Readings are made in thousandths over a range of 0.012 by means of a needle and graduated scale.

Die Cast Machine Is All-Electric

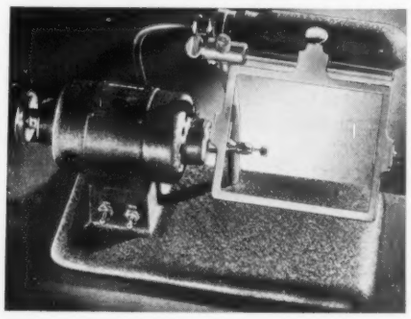
■ Michigan Die Casting Co., Detroit, has introduced a new all-electric die casting machine equipped with an induction white-metal melting furnace manufactured by Detroit Electric Furnace Co., Detroit.

Melting pot is provided with automatic control equipment for speed and accurate temperature regulation, resulting in improved product quality and lower operating costs. Co-ordination of machine and electric melting is said to give greater output with attendant production advantages.

Alloy Grinder Has Safety Glass Shield

■ Dumore Co., Racine, Wis., has developed a small precision grinder, known as model 38, for the grinding, polishing and rubber wheeling of chromium alloys and other stainless metals.

The unit is complete with hand

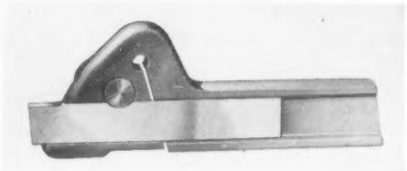


brake for quick wheel changes, adjustable safety glass eye shield, and built-in work light. It is powered by 1/5-horsepower universal motor and develops 20,000 revolutions per minute. Standard chuck for this grinder is 3/32-inch collet type, but a ⅛-inch chuck also is available.

Tool Holder Has Cam Cutter Lock

■ J. H. Williams & Co., 75 Spring street, New York, have announced development of a new cutting-off tool holder, embodying the spring principle first used in the spring threading tool produced by this company.

The goose-neck design of this holder tends to relieve cutter blade



of excess pressure, and chattering and climbing of work on the tool is said to be eliminated. Both the spring and rigid-type holders feature a positive cam cutter lock.

Turbine Pump Has Submerged Motor

■ Byron Jackson Co., Los Angeles, has placed on the market a submersible deepwell turbine pump, designed to operate with its motor below the turbine bowls.

Although the long small-diameter motor operates submerged at all times in the well water, liquid does not come in contact with electrical parts or motor bearings, as these are enclosed in an oil-filled case with a mercury seal where shaft passes through at the top. Turbine and motor form a compact unit that is attached to and supported by the discharge pipe.

Motor is a squirrel cage induction type, and its rotor is carried on two ball bearings, one to take the weight of rotary parts and the hydraulic load, and the other to center the rotor. A high dielectric oil is circulated through the entire windings at all times. Water is sealed out at the top by mercury in a rotating cup attached to the motor shaft.

This pump operates equally well in deep or shallow wells, crooked or straight wells, sumps or natural bodies of water.

Suction Device Removes Shop Fumes

■ Ruemelin Mfg. Co., 3860 North Palmer street, Milwaukee, has designed a device to collect fumes, smoke and dust created in electric welding operations.

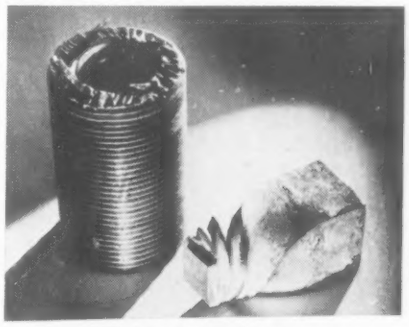
The fume inlet snout is connected by flexible rubber hose to a swivel head, permitting horizontal operation within a radius of 9 feet, vertical adjustment of 6 feet and an inward and outward travel of 6 feet 9 inches. Hose and snout assembly are supported by a counter-weighted arm and friction joints which permit instant adjustment. The snout can be pointed in any direction, independent of any movement of the hose.

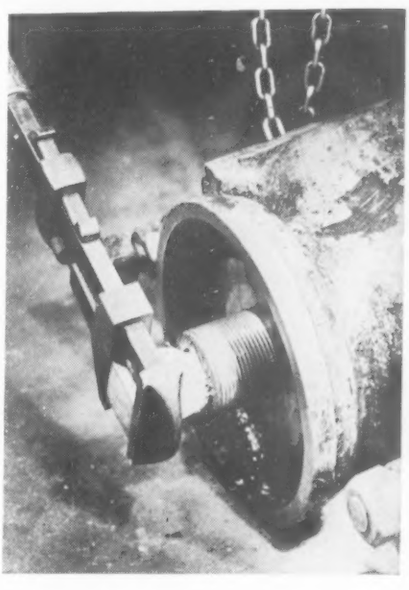
Suction for operation of this collector is produced by a 1-horsepower motor directly connected to an exhauster fan. Where two or more fume collectors are piped in series, one fan and one motor of proper capacity can be used.

Extractor Has Shallow Grip

■ Reps Tool Co., 220 Delaware avenue, Buffalo, has developed a one-piece extractor intended to solve the problem of extracting broken pipe and studs.

This tool pulls rather than reams. Its four-point grip prevents reaming and gives a strong bite without hammering or pounding. Expansion and jamming is lessened by shallow grip of the extractor. Broken pieces of pipe are removed by inserting tool straight into the pipe,





with all four points biting at the same time; a wrench is used to turn extractor in the direction of its threads. To remove studs, screws or bolts, a hole is drilled in exact center of the broken part deep enough for extractor to get its shallow grip.

Extractor is made of heat-treated forged steel with a brinell hardness of 490, and is electrolytically plated with cadmium for rust-proofing. Complete set of ten extractors fits every size and class of pipe from ⅛-inch to 2-inch and every size of studs, screws and bolts from 7/16-inch to 3½-inch.

Wheelbarrow Has Pneumatic Tire

■ American Steel Scraper Co., Sidney, O., has added to its line a pneu-

matic-tired wheelbarrow with a full capacity of 4 cubic feet.

Vertical fork is constructed of heavy steel plates, with pivot point considerably above axle of the wheel. This construction tends to place greater part of load on the wheel, greatly reducing weight on the operator. Barrow is balanced in such a manner that torque does most of the pushing, and operator merely wheels the barrow.

Jig Borer Does Precision Work

■ Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., has developed a new jig borer known as No. 1½B, which can be used for boring jigs and fixtures, or as a jig eliminator on precision boring jobs where there is not time to make jigs or fixtures.

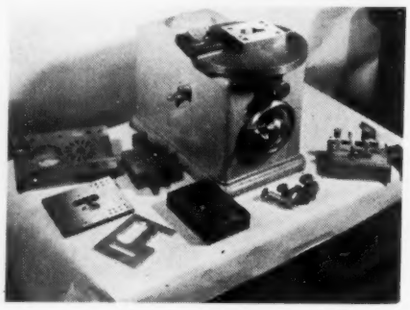
This machine has a special long table with a 10 x 48-inch working surface and a 42-inch longitudinal travel. Variable speed spindle drive is through hardened spiral bevel gears running in oil spray. Eight spindle speeds, ranging from 130 to 1800 revolutions per minute, make the machine equally adaptable for boring or reaming. Spindle quill has a 5-inch travel, which permits boring holes of an unusual depth for a machine of this size.

Open-side construction and vertical spindle make this borer suitable for precision work, as direct thrust of the cutting tool is taken upon a horizontal table supported by a heavy, rigid bed. Operator is able to follow his work more closely and use a wider range of rotary table applications.

Profile Grinder Eliminates Hand Stoning

■ Boyar-Schultz Corp., 2110 Walnut street, Chicago, has introduced a bench model precision profile grinder designed to eliminate hand stoning in fitting of dies and punches and in finishing of templates, gages, cams and special shapes.

This portable machine has a precision spindle that turns at 20,000



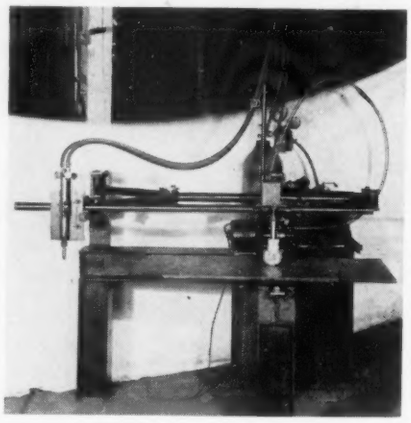
revolutions per minute, belt driven by an electric motor. Spindle handles various sizes of grinding wheels, and is instantly adjustable to provide reciprocal movement in a vertical plane. Such movement is said to assure even wear to the wheel and give maximum smoothness to the surface ground.

A ventilated cast aluminum housing encloses the machine. Work table is equipped with an elevating adjustment of 1¼ inches and tilts 5 degrees. Furnished with the grinder for positive attachment to the work table is a specially designed diamond wheel dresser.

Torch Machine Cuts Many Shapes

■ Hayes Track Appliance Co., Richmond, Ind., has recently introduced a general purpose torch machine designed to cut metal plate into a wide variety of shapes.

This is a pantograph machine, arranged with a tracing wheel to follow the contour of any templet or the lines of any drawing. The torch duplicates exactly the movement of the tracing wheel. Power to move the tracing wheel is provided by a motor secured to the



L-shaped frame of the machine. Its carrying arrangement allows the torch to be moved up and down, and it may be slanted for bevel cutting.

The tracing wheel and torch are arranged to run at speeds of approximately 5, 10, 16 and 24 inches per minute, the speed of cutting being determined largely by the thickness of material being cut and by the regularity of the cutting curve. With the 5-inch speed material 6 inches thick may be cut by using the proper tip.

Speed Control Unit Operates Automatically

■ Reeves Pulley Co., Columbus, Ind., has announced a new type of automatic remote control, known as fluid pressure control, for use with its Vari-Speed Motodrive, a speed control unit combining a driving motor, variable speed mechanism and reduction gears.

This new control can be used to regulate speed automatically from pressure variation as in stoker feed on a boiler, to maintain constant fluid pressure in a pipe line, uniform tension between machine sections, and similar requirements for automatic speed control.

Complete control consists of a bellows shifting mechanism mounted on the Motodrive, an adjustable pressure reducing valve located where desired, auxiliary valves if

needed, and connecting pipes. Fluid pressure is transmitted by means of oil, water, steam, gas or air by a valve through piping to the bellows shifting mechanism, which operates to vary speed on the Motodrive and hence on the driven machine. Air will shift the control over the widest ratio, six to one, in from two to four seconds. Amount of pressure required varies with size of the unit.

Heavy Duty Caster Has Two-Ton Capacity

■ Service Caster & Truck Co., 640 N. Brownswood avenue, Albion, Mich.,

has added to its line a new heavy duty caster for industrial trailer use.

The unit is designed to carry 4000 pounds. Forged from SAE 1045 steel with a brinell hardness of 230, this caster is said to be unbreakable. The king bolt is forged integrally with the top plate. Other features include half-inch thick steel yoke legs, double ball race in machined raceways, Hyatt bearing wheels and pressure lubrication for both yoke and wheel. This model is available in wheel sizes from 8 to 12 inches.

Radius Type-Holder Stamps Curved Surfaces

■ M. E. Cunningham Co., 115 East Carson street, Pittsburgh, has placed on the market an interchangeable type holder for stamping round or curved surfaces, such as pipe or bars.

Unlike the usual steel stamping device, this holder has a removable slide which holds type fan-wise, making it possible to get even-depth markings on curved surfaces. Only one holder is required for various radii, but it is necessary to have individual slides, and corresponding types, for each radius desired. Sides of holder are knurled, in order to give operator a firm grip. Head is of safety steel and will not mushroom or spall in service.

Molding Machine Has Increased Capacity

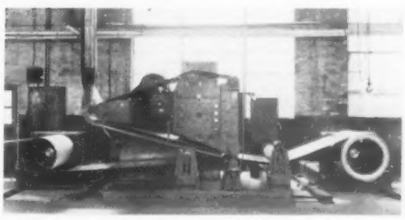
■ Reed-Prentice Corp., Worcester, Mass., has placed on the market a plastic injection molding machine of increased capacity, known as the No. 10B.

This machine has capacity for 4 ounces with 24 square inches at maximum pressure of 26,000 pounds, or 6 ounces with 40 square inches at maximum pressure of 16,000 pounds. Locking pressure of toggle mechanism is 85 tons. Larger size machines are being developed up to 32-ounce capacity.

Grinds and Polishes Strip in Coils

■ Behr-Manning Corp., Division of Norton Co., Troy, N. Y., has developed a 30-inch grinding and polishing unit, using coated abrasive paper or cloth belts, for grinding hot or cold rolled strip in coils and for polishing down to 0.005 inch.

Built to specifications by Hill Clutch Machine & Foundry Co.,



Cleveland, this unit includes automatic air control for belt alignment and automatic pressure control permitting positive setting for fine grinding and polishing, or for rough grinding with maximum stock removal. Electric controls, designed by Reliance Electric Co. and Clark Controller Co., regulate passage of strip through machine by means of a combination of reels, manufactured by Borden Construction Co.

Constant tension on strip is provided in nine steps from 200 to 8000 pounds, as required, and is regulated instantly while machine is in operation. Speed of strip may be set from 7 to 35 feet per minute in first stage and from 30 to 150 feet per minute in second stage. Operator has clear vision of strip as it enters grinding area and, if imperfections are detected, necessitating extra grinding, the strip may be reversed instantly.

Purpose of this grinder is to reclaim stock which, because of surface imperfections, cannot otherwise be satisfactorily rolled out, to improve cold rolled finishes and to produce a fine ground surface to match standard sheet finishes.

Milling Machine Has Eight Speeds

■ Hardinge Bros. Inc., Elmira, N. Y., has placed on the market a new precision milling machine for toolroom and laboratory.

This machine, known as No. BB5, has as its main feature a preloaded ball bearing spindle construction, which has proved successful on precision bench lathes and hand screw machines. Rugged construction and attractive appearance have been stressed in the design of headstock column, overarm support and pedestal base of the new unit.

Headstock is enclosed and has connected bearing design. It adapts 1-inch round capacity collets and includes notched draw spindle and spanner wrench. Feed screws revolve in long adjustable nuts and have friction dials graduated to thousandths of an inch. Hand wheels for transverse and vertical feed have clutch throw-out. Table has a large working surface, and has three slots for T-bolts to take attachments and fixtures. Base fully encloses a standard ¾-horsepower two-speed reversible motor, with an endless V-belt connected to a four-step pulley to give eight forward and eight reverse speeds, ranging from 110 to 2500 revolutions per minute.

Conveyor Carriers

(*Concluded from Page* 52)

moves six washers from bin and assembles them over six remaining studs. Now a disk spring is placed over studs in assembly fixture and nine washers put over studs. At next station, second pivot ring is assembled over studs and cover is put in place. At succeeding stages shown in Fig. 10, assemblies are removed from conveyor and nuts set down tightly with power tools.

Next a pressure plate is picked up from a belt conveyor, and assembled with other parts. After assembly, work travels on a bottom deck of belt conveyor to a dynamic balancing machine which automatically determines position and amount of unbalance. Operator removes required amount of metal as indicated by the balancing machine, rechecks balance and replaces assembled unit on conveyor going to the inspection station.

Action then is checked by flexing the clutch on an air fixture after which it is returned to the bottom shelf of the trolley conveyor. At shipping department, completed clutch assembly is removed from trolley conveyor and stacked on skids for storage or shipment. Fig. 7 shows layout of trolley conveyor line, assembly line, location of unloading and shipping docks, scrap bins, punch presses and various fabricating lines.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT

SUMMERTIME

● The better time to consider boiler room changes. A Cleveland Tramrail engineer can probably give you some worthwhile information as to improving your coal and ash handling methods.

● Motor Operated Equipment
● Hand Operated Equipment

ALSO BUILDERS OF CLEVELAND CRANES FOR EVERY INDUSTRY

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German Text Covers Science of Silicates

■ *Refractory Materials, Silicate and Silicate Bearing Bodies* (Feuerfeste Baustoffe, silikatischer und silikathaltiger Massen), by Claus Koeppel; paper, 296 pages, 5¾ x 9 inches; published by S. Hirzel, Leipzig, Germany; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This volume, which is printed in German, is designed to serve both technical and practical men in the unsurveyed field of silicate science as related to its application in the practice, performance, and commercial aspects of refractory materials. The book is divided into four principal sections discussing the one component silica earths, the multicomponents of silicic acid in refractory bodies, the transfer of silicic acid transformations in silica brick through additions of foreign materials, and silicic acids as a mixing ingredient in nonsilicate refractory bodies.

The first section relates to the element silicon, constitution of silicon combinations stable forms of silicic acid, and phase transformations of silicic acid. The second section discusses the principles and silicate equilibriums, the silicic acid system—aluminous clay, and chalk—aluminous clay, reactions of silicic acid in the solid. The fourth section describes the roll of the base material, the conception of the process of transformation acceleration, and the transformation acceleration of foreign body additions. The final section relates to magnesite and magnesium combinations, chrome refractories, and zirconium oxide and zirconium refractories.

Aids in Welding

■ Immunity to pitting, and resistance to heat plus clarified vision and the ability to outlast ordinary glass are among a few of the advantages of coated cover glass claimed by Safety Appliances Co., Braddock, Thomas and Mead streets, Philadelphia, its producers.

The new product insulates the shaded welding lenses against heat and provides protection against molten sparks fusing to its surface, thereby obviating blurred vision, eyestrain and the resultant inferior work.

ADVERTISING PAGES REMOVED

Steel Consumers Study Effects of New Prices

Sales Tend Upward As Uncertainties Gradually Lift

■ WHILE some small improvement in steel buying has followed recent price reductions which accompanied the radical recasting of the industry's basing point system, appearance of more substantial business awaits elimination of the confusion attending these changes as well as better activity among important consumers.

Action of independent steel producers in setting up additional basing points at price parity with Pittsburgh, following the step by United States Steel Corp. subsidiaries in eliminating Chicago and Birmingham differentials over Pittsburgh, has complicated the situation for both buyers and sellers.

The new setup, tending to localize the business of mills, has a similar effect on steel consumers, and in some cases has resulted in protest from the latter. As an example, eastern makers of automotive parts now find increased competition in midwestern markets, and at least one company has taken steps to enter other lines.

At the same time, certain consumers located near new basing points receive marked savings in steel costs through the revamped schedule and have strengthened their position with respect to competitors less favored by lower prices. Reports in the East that various inequalities in the new system might be rectified within the next few weeks have induced steel users in that area to delay quoting customers on manufactured products in some instances.

The fact that finished steel buying has held up reasonably well in the face of price confusion is heartening to producers. Better orders lately have appeared from buyers whose low inventories make new purchases mandatory, and total business is in heavier volume for what traditionally is steel's slowest month than was anticipated several weeks ago.

Affected by holiday shutdowns, the nation's steelmaking rate declined 4 points last week to 24 per cent. Largest drop was at Pittsburgh, off 8 points to 15 per cent. Other reductions included 3 points at Chicago to 24 per cent, 5 points at eastern Pennsylvania to 22, 1 point at Youngstown to 27 and 7.5 at Cleveland to 15.5. Wheeling advanced 6 points to 44 per cent, while Buffalo was up 2 points to 30, New England rose 10 points to 33 and Cincinnati gained 8 points to 36 per cent. Operations were unchanged at 42 per cent at Birmingham, 33.3 at St. Louis and 29 at Detroit.

Pig iron buying has responded promptly to the reduction of $4 a ton on most grades. Third quarter contracting has spurted sharply in some districts as consumers become convinced prices are unlikely to go lower and that the time is ripe for abandonment of the hand-to-mouth buying practiced until recently. Shipments for current needs, however, continue slow.

Dullness still grips some of the major steel consuming industries. Railroads are inactive in equipment markets, although platemakers are encouraged over the possibility of early distribution of steel for 5550 freight cars for the Southern Railway. Faced with prospects of a reduction in long hauls of steel products as well as increased diversion of steel traffic to cheaper forms of transportation—the outgrowth of new prices—railroads are inclined to question the extent of saving to them resulting from availability of lower cost material.

Several large orders and pending tonnages headline eastern markets for reinforcing bars and fabricated plates and shapes. Two New York city housing projects will take an estimated 25,000 tons of bars, while 15,000 tons has been placed for a third, and 6000 tons of bars and mesh is pending for state work.

Reductions in steel prices are in contrast to scrap quotations which continue upward. The steelmaking scrap composite advanced 34 cents last week, to $12.50, the third consecutive increase, bringing quotations back to the mid-April level. The iron and steel composite also was lifted by higher scrap prices, moving up 4 cents to $36.29. The finished steel composite was unchanged at $57.20.

Fourth of July cut deeply into automobile production last week and only 25,375 units were made, compared with 40,945 the preceding week. General Motors built 15,175, down from 16,900; Chrysler, 4710 against 5945; Ford, 1600 compared with 12,810, and other makers, 3890 against 5290.

COMPOSITE MARKET AVERAGES

	July 9	July 2	June 25	One Month Ago June, 1938	Three Months Ago April, 1938	One Year Ago July, 1937	Five Years Ago July, 1933
Iron and Steel	$36.33	$36.29	$38.51	$38.41	$38.61	$40.03	$29.67
Finished Steel	57.20	57.20	61.40	61.55	61.70	61.70	47.20
Steelworks Scrap..	12.50	12.16	11.46	10.89	12.30	18.51	10.66

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 9, 1938	June 1938	April 1938	July 1937
Steel bars, Pittsburgh	2.25c	2.45c	2.45c	2.45c
Steel bars, Chicago	2.25	2.40	2.50	2.50
Steel bars, Philadelphia	2.57	2.47	2.765	2.74
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.35
Shapes, Pittsburgh	2.10	2.25	2.25	2.25
Shapes, Philadelphia	2.215	2.403	2.465	2.455
Shapes, Chicago	2.10	2.25	2.30	2.30
Tank plates, Pittsburgh	2.10	2.25	2.25	2.25
Tank plates, Philadelphia	2.295	2.445	2.445	2.435
Tank plates, Chicago	2.10	2.25	2.30	2.30
Sheets, hot rolled, Pittsburgh	2.15	2.40	2.40	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.45	3.45	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.75	3.80	3.80
Sheets, hot rolled, Chicago	2.15	2.40	2.50	2.50
Sheets, cold-rolled, Chicago	3.20	3.20	3.25	3.25
Sheets, No. 24, galv., Gary	3.50	3.80	3.90	3.90
Bright bess., basic wire, Pitts.	2.60	2.90	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	$5.25	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.75	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$37.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	37.00	37.00	37.00
Rerolling billets, Pittsburgh	34.00	37.00	37.00	37.00
Wire rods, No. 5 to 5/32-inch, Pitts.	43.00	47.00	47.00	47.00

Pig Iron

	July 9, 1938	June 1938	April 1938	July 1937
Bessemer, del. Pittsburgh	$21.34	$25.34	$25.30	$25.26
Basic, Valley	19.50	23.50	23.50	23.50
Basic, eastern, del., Philadelphia	21.34	24.69	25.34	25.26
No. 2 foundry, Pittsburgh	21.21	25.21	25.21	25.21
No. 2 foundry, Chicago	20.00	24.00	24.00	24.00
Southern No. 2, Birmingham	16.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	19.89	23.89	23.89	23.69
No. 2X eastern, del. Philadelphia	22.215	25.465	26.215	26.135
Malleable Valley	20.00	24.00	24.00	24.00
Malleable, Chicago	20.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	30.34	30.34	30.34
Gray forge, del Pittsburgh	20.17	24.17	24.17	24.17
Ferromanganese, del. Pittsburgh	97.77	107.77	107.77	107.29

Scrap

Heavy melting steel, Pittsburgh	$13.25	$11.40	$12.70	$19.40
Heavy melt. steel, No. 2, E. Pa.	11.75	9.875	11.55	16.55
Heavy melting steel, Chicago	11.25	10.25	11.45	17.75
Rails for rolling, Chicago	16.75	14.90	15.25	20.30
Railroad steel specialties, Chicago	14.75	13.50	13.75	20.20

Coke

Connellsville, furnace, ovens	$3.75	$3.90	$4.25	$4.50
Connellsville, foundry, ovens	5.00	5.05	5.25	5.30
Chicago, by-product foundry, del.	11.00	11.00	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Gary	2.15c
Chicago, delivered	2.18c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown	2.15c
Youngstown	2.15c
Pac. base pts. f.o.b. cars, dock	2.75c

Galvanized No. 24

Pittsburgh	3.50c
Gary	3.50c
Chicago, delivered	3.53c
Cleveland	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown	3.50c
Youngstown	3.50c
Pac. base pts. f.o.b. cars, dock	4.10c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
Granite City, Ill.	3.50c

Cold Rolled

Pittsburgh	3.20c
Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown	3.20c
Youngstown	3.20c
Pac. base pts. f.o.b. cars, dock,	3.60c

Long Ternes No. 24 Unassorted

Pittsburgh	3.95c
Gary	3.95c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown	2.75c	3.35c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.40c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.34½c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific basing points, f.o.b. cars, dock	2.70c
Do. floor plates	3.95c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Mfg. terne plate, Pittsburgh	4.65c
Gary	4.75c
Granite City	4.85c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.39c
Pacific coast basing pts., f.o.b. cars dock	2.70c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.40c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.67c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific coast basing pts., f.o.b. cars, dock	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c
Moline, Ill.	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.90c
Gulf ports	2.25c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Pitts.-Cleve.-Chgo., 100 lb. keg	
Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.70c
Chicago	2.70c
Gary, Ind.	2.70c
Detroit	2.75c
Cleveland	2.70c
Buffalo	2.70c

Subject to quantity deductions and extras.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25 Mo.		0.55
4600	0.20 to 0.30 Mo. 1.50-2.00 Ni.		1.10
5100	0.80-1.10 Cr.		0.45
5100	Cr. spring flats		0.15
6100	bars		1.20
6100	spring flats		0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200	spring flats		0.15
9200	spring rounds, squares		0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23/16-in. Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.58c
New York, del.	2.61c
Cooperage hoop. Pittsburgh, Chicago	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c

Worcester, Mass. $4 higher.

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	42.00
Angle bars, billet, mills	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 70-5 off; in packages with nuts separate 70-10-5 off; in bulk 80-5 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off

Plow Bolts

All sizes	65-5-5 off

Nuts

Semifinished hex.; ⅛-in. and smaller	60-10-5 off
Do., ⅛ to 1-inch	60-5-5 off
Do., over 1-inch	60-5 off

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in. smaller	70-5-5-off

Square Head Set Screws

Upset, 1-in., smaller	80-5-5 off
Headless set screws	75-5 off

Rivets, Washers

Structural, Pittsburgh, Cleveland	3.40c
Structural, Chicago	3.40c

⅞-inch and smaller.

Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	61	52½
2½—3	64	57½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
10-inch lap weld	63½	
12-inch, lap weld	62½	

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	00.00
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$43.00
4-in., Birmingham	46.00
4-in., Chicago	53.80
6 to 24-in., Chicago	50.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

Rerolling Quality

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Philadelphia	36.50
Duluth	39.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	34.00

Wire Rods

Pitts., Cleveland, Chicago, Bham., No. 5 to ⅜-inch, incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., frt. all. East of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c
Per ton, bulk, f.o.b. oven or port	
Sulphate of ammonia	$29.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$21.00	$21.50	$20.50	$22.00
Birdsboro, Pa.	21.00	21.50	20.50	22.00
Birmingham, Ala.‡	16.38	.....	15.38	21.00
Buffalo	20.00	20.50	19.00	21.00
Chicago	20.00	20.00	19.50	20.50
Cleveland	20.00	20.00	19.50	20.50
Detroit	20.00	20.00	19.50	20.50
Duluth	20.50	20.50	.....	21.00
Erie, Pa.	20.00	20.50	19.50	21.00
Everett, Mass.	21.75	22.25	21.25	22.75
Granite City, Ill.	20.00	20.00	19.50	20.50
Hamilton, O.	20.00	20.00	19.50	.....
Neville Island, Pa.	20.00	20.00	19.50	20.50
Provo, Utah	18.00	.....	.....	.....
Sharpsville, Pa.	20.00	20.00	19.50	20.50
Sparrow's Point, Md.	21.00	.....	20.50	.....
Swedeland, Pa.	21.00	21.50	20.50	22.00
Toledo, O.	20.00	20.00	19.50	20.50
Youngstown, O.	20.00	20.00	19.50	20.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	21.39	21.39	20.89	21.89
Baltimore from Birmingham	21.78	.....	20.66	.....
Boston from Birmingham	21.87	.....	.....	.....
Boston from Everett, Mass.	22.25	22.75	21.75	23.25
Boston from Buffalo	22.25	22.75	21.75	23.25
Brooklyn, N. Y., from Bethlehem	23.50	24.00	.....	.....
Canton, O., from Cleveland	21.39	21.39	20.89	21.89
Chicago from Birmingham	†20.22	.....	.....	.....
Cincinnati from Hamilton, O.	20.44	21.11	20.78	.....
Cincinnati from Birmingham	20.06	.....	19.06	.....
Cleveland from Birmingham	20.32	.....	19.82	.....
Mansfield, O., from Toledo, O.	21.94	21.94	21.44	21.44
Milwaukee from Chicago	21.10	21.10	20.60	21.10
Muskegon, Mich., from Chicago, Toledo or Detroit	23.19	23.19	22.69	23.69
Newark, N. J., from Birmingham	22.15	.....	.....	.....
Newark, N. J., from Bethlehem	22.53	23.03	.....	.....
Philadelphia from Birmingham	21.46	.....	20.96	.....
Philadelphia from Swedeland, Pa.	21.84	22.34	21.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	22.45	22.45	21.95	21.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.55	20.55	20.05	.....
St. Louis from Birmingham	†20.12	.....	19.82	.....
St. Paul from Duluth	22.08	22.08	.....	22.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $25.50, Phil. base, standard and copper bearing, $26.63.

Gray Forge		Charcoal	
Valley furnace	$19.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	19.50	do., del. Chicago	28.34
		Lyles, Tenn	23.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $24.50; 6.51-7—$25.00; 7-7.50—$25.50; 7.51-8—$26.00; 8-8.50—$26.50; 8.51-9—$27.00; 9-9.50—$27.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.49

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman., 2½ carbon 97.75
2% carbon 102.75 1% 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.79-2.80

Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots 1.23
Do, less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls 2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton 142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. 2.80
Do, smaller lots 3.00-3.10

Vanadium Pentoxide, contract, lb. contained 1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton 69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton 97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa., 200-lb. kegs, lb. 2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.86	3.85	5.51	3.86	4.93	4.85
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.85	3.85	4.35	3.65	3.65	5.00	3.65	....	4.75
Baltimore	4.00	4.20	4.45	3.90	3.90	5.50	3.95	....	4.70
Norfolk, Va.	4.20	4.40	4.65	4.10	4.10	5.70	4.15	....	5.40
Buffalo	3.60	4.00	4.00	3.80	3.55	5.40	3.50	....	5.38
Pittsburgh	3.80	4.00	4.00	3.70	3.70	5.30	3.75	....	5.15
Cleveland	3.50	3.93	3.93	3.55	3.73	5.33	3.50	4.70	4.68
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	5.30	4.74
Cincinnati	3.85	4.00	4.00	3.80	3.83	5.43	3.75	....	4.78
Chicago	3.85	4.10	4.10	3.75	3.75	5.35	3.85	....	5.25
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	4.12	4.37	4.37	4.02	4.02	5.62	4.12	....	5.52
Kansas City	4.15	4.40	4.40	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	4.96	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.79
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	....	5.15
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.95	4.15	4.15	5.90	4.30	6.50	5.60
Portland, Oreg.	4.45	4.95	6.30	4.25	4.25	6.00	4.50	....	5.90
Los Angeles	4.30	4.80	6.55	4.30	4.30	6.20	4.50	....	5.25
San Francisco	4.05	4.45	6.00	3.95	3.95	5.45	4.10	6.40	5.25

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.76	4.71	4.28	7.65	6.25	6.00	8.15	9.02	7.57
New York	3.66	4.39	4.14	7.50	6.10	5.85	9.25	8.69	7.29
Philadelphia	366	4.36	4.10	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.55	4.15	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	8.65	8.60	8.15
Pittsburgh	.	4.15	3.95	7.70	6.25	8.50	9.10	8.70	7.25
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.45	7.05
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.91	4.30	4.05	7.60	6.15	5.90	8.00	8.60	7.15
Minneapolis	....	4.83	4.00	7.60	6.20	8.73	9.28	9.23	7.78
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	4.01	4.57	4.32	7.97	6.52	6.27	8.37	8.97	7.52
Kansas City	4.46	4.85	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.34	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.98	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	6.05	....	8.00	8.00	8.65	....	....
Portland, Oreg.	....	5.85	5.85	9.00	8.00	7.85	8.70	....	....
Los Angeles	5.96	6.85	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, July 7

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental North Sea ports, gross tons Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$27.17 5 10 0	$15.68	1 19 0
Basic bessemer	....	17.89	2 4 6
Hematite, Phos. .03-.05	32.11 6 10 0*	.....	.....
Billets	$38.90 7 17 6	$34.17	4 5 0
Wire rods, No. 5 gage	55.70 11 5 6	41.21	5 2 6
Standard rails	$50.02 10 2 6	$46.23	5 15 0
Merchant bars	2.43c 11 0 0	1.91c	5 5 0
Structural shapes	2.35c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.56c 11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.87c 13 0 0	2.64c	7 5 0°
Sheets, gal., 24 ga., corr.	3.70c 16 15 0	3.18c	8 15 0
Bands and strips	2.93c 13 5 0	2.00c	5 10 0
Plain wire, base	4.31c 19 10 0	2.23c to 2.64c	6 2 6 to 7 5 0
Galvanized wire, base	5.14c 23 5 0	2.85c to 2.95c	7 17 6 to 8 2 6
Wire nails, base	4.09c 18 10 0	2.54c to 2.72c	7 0 0 to 2 10 0
Tin plate, box 108 lbs.	$ 5.00 1 0 3	.....	.....

British ferromanganese $102.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$26.92 5 9 0(a)	$16.62	598	$14.92	440	$25.32 63
Basic bess. pig iron	24.70 5 0 0(a)	.....	...	.....	...	27.94 (b)69.50
Furnace coke	7.41 1 10 0	5.70	205	7.29	215	7.64 19
Billets	38.90 7 17 6	23.35	840	29.15	860	38.79 96.50
Standard rails	2.24c 10 2 6	1.50c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.70c 12 4 0††	1.40c	1,080	1.65c	1,100	1.98c 110
Structural shapes	2.44c 11 0 6††	1.37c	1,055	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.59c 11 14 3††	1.76c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.48c 15 15 0§	1.30c‡	1,600‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	4.09c 18 10 0	2.93c	2,250	4.43c	2,950	6.66c 370
Plain wire	4.31c 19 10 0	2.16c	1,660	2.48c	1,650	3.11c 173
Bands and strips	2.86c 12 19 0††	1.57c	1,210	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 65 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	11.50
Bos. dock No. 1 exp.	10.00-10.50
New Eng. del. No. 1	10.50-11.00
Buffalo, No. 1	11.00-11.50
Chicago, No. 1	11.00-11.50
Chicago, auto, no alloy	9.50-10.00
Chicago, No. 2 auto	8.50- 9.00
Cincinnati, dealers	9.00- 9.50
Cleveland, No. 1	11.50-12.00
Cleveland, No. 2	10.50-11.00
Detroit, No. 1	8.00- 8.50
Eastern Pa., No. 1	13.00-13.50
Eastern Pa., No. 2	11.50-12.00
Federal, Ill.	10.00-10.50
Granite City, R. R.	10.00-10.50
Granite City, No. 2	9.00- 9.50
Los Angeles, No. 1	11.50-12.00
Los Angeles, No. 2	10.00-10.50
New York, No. 1	†10.00
N. Y. dock No. 1 exp.	†11.00
Pitts., No. 1 (R. R.)	14.00-14.50
Pittsburgh, No. 1	13.00-13.50
Pittsburgh, No. 2	11.50-12.00
St. Louis, R. R.	10.50-11.00
St. Louis, No. 2	9.00- 9.50
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-12.00
Toronto, dirs. No. 1	8.00
Valleys, No. 1	12.00-12.50

COMPRESSED SHEETS

Buffalo	10.00-10.50
Chicago, factory	10.50-11.00
Chicago, dealer	8.50- 9.00
Cleveland	11.00-11.50
Detroit	9.50-10.00
E. Pa., new mat.	13.00-13.50
E. Pa., old mat.	9.50-10.00
Los Angeles	12.50-13.00
Pittsburgh	13.00-13.50
St. Louis	5.50- 6.00
Valleys	11.50-12.00
Cincinnati, del	8.50- 9.00

BUNDLED SHEETS

Buffalo, new	10.00-10.50
Buffalo, old	9.00- 9.50
Cleveland	7.00- 7.50
Los Angeles	11.00-11.50
Pittsburgh	11.50-12.00
St. Louis	4.75- 5.25
Toronto, dealers	5.00

SHEET CLIPPINGS, LOOSE

Chicago	5.25- 5.75
Cincinnati, dealers	4.50- 5.00
Detroit	6.50- 7.00
†Los Angeles	3.75- 4.00
St. Louis	3.75- 4.00

BUSHELING

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	9.50-10.00
Cincin., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	5.75- 6.25
Detroit, No. 1, new	8.00- 8.50
Valleys, new, No. 1	10.00-10.50
Toronto, dealers	5.00

MACHINE TURNINGS (Long)

Birmingham	6.00- 7.00
Buffalo	6.00- 6.50
Chicago	5.50- 6.00
Cincinnati, dealers	3.25- 3.75
Cleveland	4.75- 5.25
Detroit	4.00- 4.50
Eastern Pa.	7.50- 8.00
Los Angeles	4.00- 4.25
New York	†2.50- 3.00
Pittsburgh	7.00- 7.50
St. Louis	1.50- 2.00
Toronto, dealers	5.00
Valleys	7.00- 7.50

SHOVELING TURNINGS

Buffalo	6.50- 7.00
Cleveland	5.00- 5.50
Chicago	6.00- 6.50
Detroit	6.50- 7.00
Pittsburgh	7.00- 7.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	1.25
Buffalo	5.50- 6.00
Cincinnati, dealers	2.50- 3.00
Cleveland	5.75- 6.25
Eastern Pa.	6.00- 6.50
Detroit	5.50- 6.00
New York	†2.00- 2.50
Pittsburgh	6.25- 6.75
Toronto, dealers	5.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	10.00-10.50
Eastern Pa.	9.50 10.00
St. Louis	8.00- 8.50
Toronto	6.00

CAST IRON BORINGS

Birmingham	6.00- 6.50
Boston dist. chem.	†5.00
Bos. dist. for mills	†6.00
Buffalo	5.50- 6.00
Chicago	5.00- 5.50
Cincinnati, dealers	2.50- 3.00
Cleveland	5.75- 6.25
Detroit	5.50- 6.00
E. Pa., chemical	9.50-10.50
New York	†3.00- 3.50
St. Louis	1.50- 2.00
Toronto, dealers	5.50

RAILROAD SPECIALTIES

Chicago	14.50-15.00

ANGLE BARS—STEEL

Chicago	13.00-13.50
St. Louis	10.50-11.00

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	14.00-14.50
Chicago, leaf	13.50-14.00
Eastern Pa.	16.50-17.00
Pittsburgh	15.50-16.00
St. Louis	12.50-13.00

STEEL RAILS, SHORT

Birmingham	14.00
Buffalo	16.00-16.50
Chicago (3 ft.)	13.50-14.00
Chicago (2 ft.)	14.50-15.00
Cincinnati, dealers	16.25-16.75
Detroit	14.00-14.50
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	15.50-16.00
St. Louis, 2 ft. & less	13.00-13.50

STEEL RAILS, SCRAP

Boston district	†9.00
Buffalo	13.50-14.00
Chicago	11.50-12.00
Cleveland	15.00-16.00
Pittsburgh	14.50-15.00
St. Louis	10.50-11.00
Seattle	16.00

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	10.50-11.00

ARCH BARS, TRANSOMS

St. Louis	11.25-11.75

PIPE AND FLUES

Cincinnati, dealers	5.50- 6.00
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.00- 7.50
Cincinnati, dealers	6.00- 6.50
Eastern Pa.	12.00-12.50
New York	†7.00- 7.50
St. Louis	7.00- 7.50

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net	8.00- 8.50
Eastern Pa., No. 1	14.00-14.50
St. Louis, No. 1	8.00- 8.50
St. Louis, No. 2	9.75-10.25
Toronto, No. 1 dlr.	14.00

FORGE FLASHINGS

Boston district	†5.75
Buffalo	10.00-10.50
Cleveland	8.50- 9.00
Detroit	7.25- 7.75
Los Angeles	9.00
Pittsburgh	11.50-12.00

FORGE SCRAP

Boston district	†5.75
Chicago, heavy	14.00-14.50

LOW PHOSPHORUS

Buffalo, crops	15.00-15.50
Cleveland, crops	16.00-16.50
Eastern Pa., crops	16.50-17.00
Pittsburgh, crops	16.00-16.50

LOW PHOS. PUNCHINGS

Buffalo	15.00-15.50
Chicago	14.00-14.50
Eastern Pa.	16.50-17.00
Pitts. (light & hvy.)	13.50-14.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†9.50
Chicago	16.50-17.00
New York	†13.50-14.00
Eastern Pa.	16.00-16.50
St. Louis	13.25-13.75

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	16.50-17.00
Boston district	†14.00
Chicago, net	15.50-16.00
Eastern Pa.	21.50-22.50
St. Louis	15.00-15.50

LOCOMOTIVE TIRES

Chicago (cut)	14.00-14.50
St. Louis, No. 1	12.00-12.50

SHAFTING

Boston district	†13.25-13.50
New York	†15.00
Eastern Pa.	19.00-19.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron	†9.75
Buffalo, steel	15.00-15.50
Chicago, iron	12.50-13.00
Chicago, rolled steel	14.50-15.00
Cincin., iron, deal.	14.00-14.50
Eastern Pa., iron	15.00-15.50
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	13.50-14.00
Pittsburgh, steel	15.50-16.00
St. Louis, iron	11.00-11.50
St. Louis, steel	12.25-12.75

NO. 1 CAST SCRAP

Birmingham	13.00-13.50
Boston, No. 1 mach.	†10.50
N. Eng. del. No. 2	10.00-10.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	13.50-14.00
Buffalo, mach.	14.50-15.00
Chicago, agri. net	9.00- 9.50
Chicago, auto	9.50-10.00
Chicago, railr'd net	9.50-10.00
Chicago, mach. net	10.25-10.75
Cincin., mach. deal.	10.75-11.25
Cleveland, mach. net	15.00-16.00
Eastern Pa., cupola	15.50-16.00
E. Pa., mixed yard	13.00-13.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	9.50-10.00
St. L., No. 1, mach.	12.00-12.50
St. Louis, agr. mach.	11.25-11.75
Toronto, No. 1, mach., net	10.50

HEAVY CAST

Boston dist. break.	†9.00
New England, del.	10.50-11.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, break.	9.00- 9.50
Detroit, auto net	11.00-11.50
Eastern Pa.	14.00-14.50
Los Ang., auto. net	13.00-13.50
New York, break.	†9.50-10.00
Pittsburgh, break.	12.00-12.50

STOVE PLATE

Birmingham	8.00- 8.50
Boston district	†6.50- 7.00
Buffalo	11.00-11.50
Chicago, net	7.00- 7.50
Cincinnati, dealers	5.75- 6.25
Detroit, net	8.50- 9.00
Eastern Pa.	12.00-12.50
New York, fdry.	†8.00
St. Louis	6.75- 7.25
Toronto, dealers, net	7.00

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	13.00
Buffalo	13.00-13.50
Chicago, R. R.	13.00-13.50
Cincin., agri. deal.	10.25-10.75
Cleveland, rail	13.25-13.75
Eastern Pa., R. R.	14.00-14.50
Los Angeles	17.50-18.00
Pittsburgh, rail	13.50-14.00
St. Louis, R. R.	10.00-10.50

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00-13.00
No. Afr. low phos.	nominal
Swedish low phos.	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom.	12.00
Tungsten, sh. ton unit, duty pd. nom.	$18.00-19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	non. 45.00
So. African, 50-52%	nom. 45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 74

Pittsburgh — Considerable unsettlement still prevails in this market, and while some business is being placed, orders remain light. Production is unchanged, output of common and full finished sheets holding about 30 per cent. Galvanized operations are steady at 39 per cent. The revamped price structure on galvanized sheets has created uncertainty, and some time is expected to be required for complete clarification of new base prices.

Cleveland—Establishment of new basing points on most grades of flat-rolled steel at Youngstown and Middletown, O., has been announced by producers in those two centers. Youngstown base applies on hot and cold-rolled, galvanized, and porcelain enameling sheets. The Middletown base affects hot and cold-rolled and galvanized material. While price uncertainty and the recent holiday have restricted specifications lately, sellers confidently anticipate material improvement in business after the middle of this month.

Chicago — Wisconsin bureau of purchases, Madison, Wis., has divided 300 tons of 26 gage steel sheets for 1939 automobile license tag material between Inland Steel Co., Chicago, and National Enameling & Stamping Co., Milwaukee.

Boston — While Sparrows Point, Md., is the new base for most sheet grades delivered here, the price setup indicates that mills located farther west will continue competitive in New England. However, definite conclusions await appearance of better business. The 36-cent freight from Sparrows Point to Boston is only 1 cent less than the Buffalo-Boston rate. Considerable of blue annealed sheets sold here are rolled by the Claymont, Del., mill, the freight being 32 cents, or 4 cents less than from Sparrows Point. Galvanized sheets now are 3.86c, Boston. First definite reaction to new prices and bases is expected to be reflected in warehouse buying.

New York—Sheet inquiry is more active despite little change in actual sales. Sellers also are encouraged by increase in size of individual inquiries, indicating a disposition among buyers to tend away from the hand-to-mouth purchasing that has characterized recent weeks. Some reflection of PWA activity is noted in demand for corrosion-resisting sheets.

Philadelphia—Some miscellaneous sheet business has been placed the past few days subject to possible price adjustments, and jobbers have added to stocks of galvanized sheets. Total business is at about the level of the past two to three weeks but is disappointing in that anticipated orders from stampers have not materialized. One of the largest stove makers is farming out part of its stamping work to an automotive parts interest for the first time, and the latter is expected in the market shortly for enameling sheets. Sheet prices are steady at new levels.

Buffalo — Improved buying of sheets is attributed at least in part to the new Buffalo base which results in substantially lower prices for delivery in this district. Many buyers are believed to have remained out of the market until definite price announcements were made. Moderate inquiries have appeared from consumers of hot and cold-rolled sheets, but demand for galvanized continues to lag.

Cincinnati—Lower prices and new basing points thus far have had little effect on sheet demand. Undertone of the market is improved,

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however, and the recent holiday retarded business only briefly. Automotive orders are spotty, with little improvement looked for before August.

Birmingham, Ala.—Some quickening of the market for sheets, noted last week, is still evident, with galvanized sheets maintaining the slightly accelerated tempo set a few days ago. Other classes remain relatively light, but shipments are in somewhat more satisfactory ratio.

St. Louis — Changes in sheet demand are slight, limited principally to mild betterment in specifications from miscellaneous users. Stovemakers are taking fair tonnages, including enameling stock, and the implement industry is expected to increase its requirements the next few weeks.

Strip

Strip Prices, Page 75

Pittsburgh—Strip sales are slow to improve. Little business has been received thus far for new automobile models, while other consumers are buying sporadically. Strip production has gained slightly but still is around 20 per cent, with hot strip slightly less active than the cold-rolled division.

Cleveland — New base prices on hot and cold-rolled strip have failed to stimulate demand as some sellers anticipated. Consumers appear in no hurry to enter the market, pending clarification of the price system which has been altered materially by the establishment of new basing points. Youngstown, O., has been established as a new base for hot and cold-rolled strip, and Middletown, O., is a new base for hot-rolled strip. Prices at both points are on a parity with Pittsburgh and Cleveland.

Boston—Upturn in narrow cold strip buying has failed to develop in volume following the slump in demand pending price clarifications. As a result, re-rolling operations continue light with little or no advance business on mill books. Nevertheless producers look for an early gain of at least mild proportions, low consumer inventories and lower but stabilized prices being encouraging factors. Helped by a $4 differential on eastern business, sellers of cold strip will remain competitive for tonnage at most midwest consuming centers, although forced to absorb greater freight charges in some instances.

New York—Cold strip buying continues slack. While consumer inventories are low, fabricating operations are light and finished goods still move slowly. Cold strip now is 2.31c, New York, on a Pittsburgh base. Hot strip demand is confined to fill-in lots, though heavy stocks acquired over the year-end are down with more gaps appearing.

Buffalo — Strip business has improved here. Inquiries from jobbers as well as consumers are heavier, though the former are guarding against building up excessive inventories. The leading strip producer here maintained a triple turn the past week and is expected to continue at the same rate this week.

Birmingham, Ala.—Strip demand is awaiting development of business in cotton ties, usually evident about the middle of July. The season's demand is not expected to be materially short of normal.

Tin Plate

Tin Plate Prices, Page 74

New York—Excess stocks of tin plate carried over from last year continue an important factor in lim-

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iting demand, though below-normal buying of containers also is an important influence. While tin plate prices are unchanged, buyers look for lower quotations once current contracts expire, hence purchasing is as conservative as possible. Export demand remains light.

Chicago — Tin plate consumption has tapered in some directions, with little indication of an early revival in buying. One local producer, recently operating near capacity, was down last week.

Plates

Plate Prices, Page 74

Cleveland — Requirements of plate users are substantially unchanged. Sellers recorded a slight gain in bookings during June, but inquiries continue limited to small lots.

Chicago — Plate sales are quiet here and fabricators continue to order for only immediate needs. Prompt delivery generally is requested on new business and in the absence of backlogs producers are able to make fairly early shipment. Little indication is seen of an early revival in plate consumption by railroads.

Boston — With three eastern basing points on plates now established, confusion over delivered prices is beginning to clear. The new Claymont, Del., base at 2.10c makes plates 2.42c, Boston, freight from Claymont of 32 cents comparing with 33 cents from Coatesville, Pa. For years the latter has been the basing point for New England. Orders are slightly more numerous, but are small individually and for prompt delivery. Pullman-Standard Car Mfg. Co. has started delivery on 50 passenger coaches for the New Haven railroad, averaging five to six weekly.

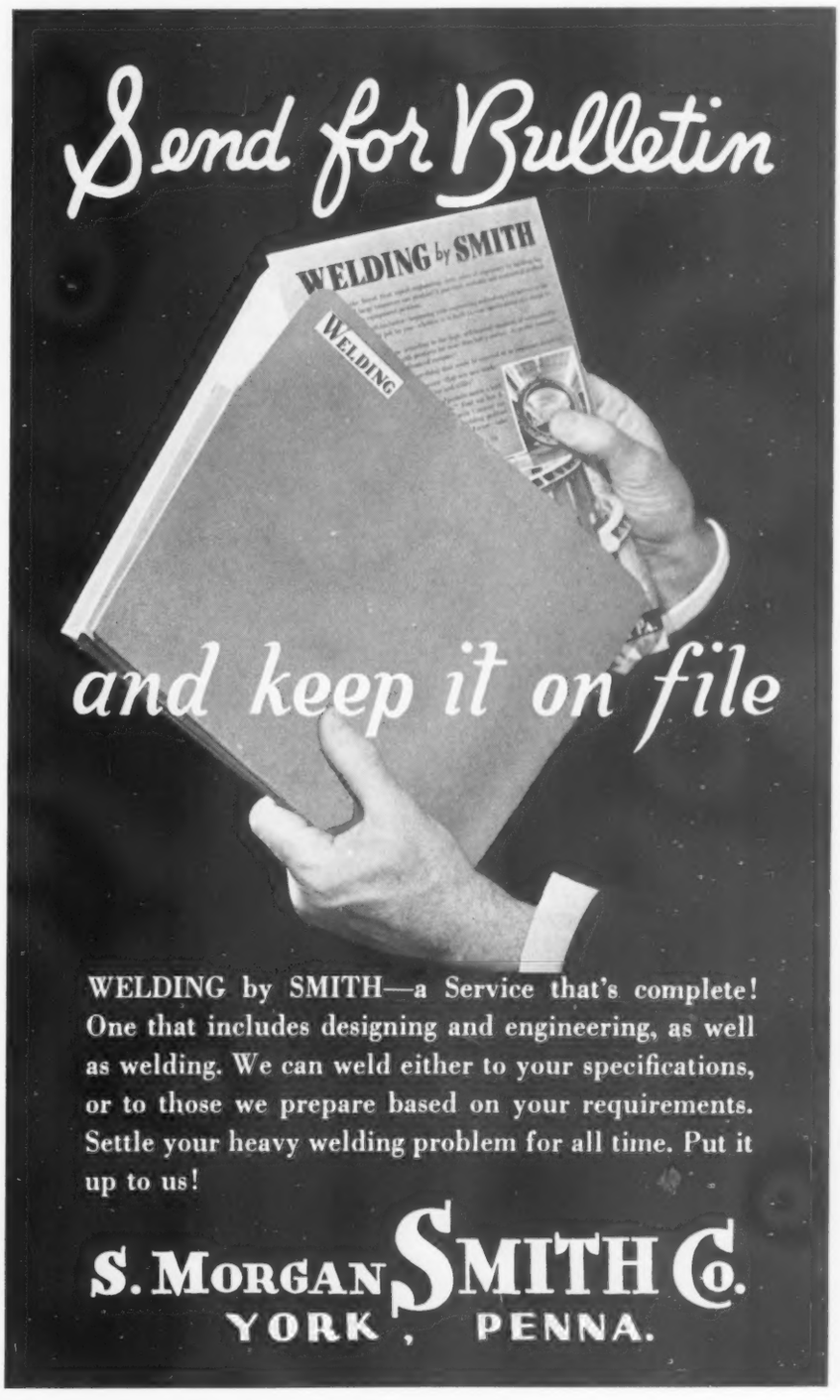
Taking nearly 10,000 tons of steel, mostly plates, five submarines will be built in New England yards. Electric Boat Co., Groton, Conn., will construct three at $3,067,000 each, while two will be fabricated at the Portsmouth, N. H., navy yards. Another is allocated the navy yard, Mare Island, Calif.

New York — Establishment of a Claymont, Del., base on plates at 2.10c provides a base for local delivery other than Coatesville, Pa., for the first time in many years. Freight from Claymont is 19 cents per 100 pounds, against 20 cents from Coatesville. Demand has yet to respond to lower prices, but sizable tonnages are pending. Action is looked for shortly on the award of 30 scows, taking 9000 tons of steel, principally plates, for the local sanitation department. Plate makers also are encouraged over possibility of early distribution of steel for the Southern railway's 5550 freight cars.

New plate prices failed to hold on much of the tonnage bid to the navy July 5. One eastern mill quoted from $1 to $2 a ton under the market on various classes.

Philadelphia—Sun Ship Building & Dry Dock Co. has booked a tanker for Atlantic Refining Co. requiring about 4000 tons of plates and shapes. Navy department is taking bids July 19 on 160 tons of plates and shapes for the battleship Washington, and a district plant is figuring on a gold dredge involving 1600 tons. No additional releases have been made for commercial ship work, but early action is expected on C-2 cargo boats booked by the Sun company. Pennsylvania railroad has yet to take action on its car program and railroad requirements elsewhere are negligible.

San Francisco — Bids are expected to be called for soon for 750 tons, in addition to 750 tons of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Behind the Scenes with STEEL

Bier Hier

■ From over in Steelton, Pa. comes another contender for the small beer (light or dark) offered for unscrambling the intriguing name of our Russian advertiser: Sojuzugleexport. This one now has the inside track and if someone doesn't hurry up with something better, the beer will be carefully packed in excelsior, crated and expressed over to the town of steel. The solution reads: *Ex-G.O.P. Rule Just—Zo?*

Market Moves

■ Bill Gude, *pronounced — goodie,* is sorely tempted to pack up his old carpet bag and buzz over to the big city for an audition as the tobacco auctioneer, after the last two weeks of price changes. They were coming over the wires and through the mails so fast for a while that Bill was chanting away in true Lucky Strike fashion. As a matter of fact at one stage of the game, when a wire was received that a new basing point had been set up and differentials eliminated by a certain producer, the producer's local office was telephoned for confirmation and they didn't even know about it themselves. This is just another concrete example of why the circulation department keeps bragging about STEEL being a step ahead of progress.

Real Service

■ And even if the business department exaggerates just a wee bit sometimes, Bill and his crew of market editors are none the less right on the ball. Each week they contact something over four hundred consumers, producers and distributors to check and recheck their final quotations. By personal contact, telephone calls and mail they lend an ear to the people in the know. By direct wire their reports are shot into Cleveland and any price changes or announcements up until the close of business on Friday will be reported to you in Monday morning's issue. This is the most timely and the fastest weekly service available and when you stop to consider that this copy of STEEL you're holding cost you as a subscriber less than six cents delivered, and that you are only one of six persons (on the average) who will read it, you will probably blush with shame and want to send along a donation. Well, we don't like that sort of thing but if you just can't resist the desire, make all checks payable to Shrdlu.

Repeater

■ We seem to get on a lot of trick mailing lists (oh, you do too, Huh?) but the one that amuses us the most is from some company down south that has a cure for athlete's foot. Regularly several times a year—for the last five years—they send along their letter, and we mean their *letter* because it has never been changed. It starts out: "We just received word from the U. S. government that there were umpsteen million cases of athlete's foot in the country." They must have had one of those efficiency guys handling their direct mail advertising and he figured if he bought a twenty year supply of those letters he'd save plenty of money.

Spelling Bee

■ J. F. Froggett, senior editor of our country cousin, *Daily Metal Trade,* hopped us a few weeks ago for spelling "jalopie" in such horrible fashion. "Jallopy" says Joe, and insists he'll eat his hat if tain't so. In this morning's inter-office mail, Joe gallantly slipped a clipping from the Birmingham, Ala. *Post* with "jallopies" set off nicely in a big headline. Of course, the singular was with a "y" and we're still wrong but so is J. F. F. He hasn't eaten his straw sailor yet but we're afraid he may work up quite an appetite chasing us around the block after reading this.

—SHRDLU

shapes, for facing of the Big Creek dam in California for Southern California Edison Co., Los Angeles. The water and power department, Los Angeles, has made application to PWA for a loan and grant to cover construction work in Mono basin and for a distributing system in and near Los Angeles. The project calls for over 235,000 feet of 8 to 72-inch pipe.

Plate Contracts Placed

500 tons, fuel oil tank, Hartford Electric Light Co., Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

Plate Contracts Pending

1640 tons for 102-inch welded plate steel conduit linings for outlet works, Grand Coulee dam, specification 789, Emsco Derrick & Equipment Co., Los Angeles, and Berkeley Steel Construction Co., Berkeley, Calif., low; bids July 1, to bureau of reclamation, Denver.

1455 tons, for navy, various yards; Central Steel Co. low on bulk bids, schedule 3773.

750 tons, dam facing at Big Creek, Calif., for Southern California Edison Co., Los Angeles; bids soon.

660 tons, 42-inch electrically welded steel pipe with alternates on reinforced concrete, section 1, Oakwood avenue supply main, metropolitan district commission, Hartford, Conn.

Unstated tonnage, 250,000 gallon elevated steel tank, for U. S. Penitentiary, Leavenworth, Kans.; bids July 15.

Bars

Bar Prices, Page 74

Pittsburgh — Better inquiries for bars are regarded to a certain extent as being for price checking purposes, since buying continues slow. Buyers are seeking the best source of supply, and much clarification of the market as regards prices and most favorable basing points remain to be accomplished. Some of recent inquiries are expected to be converted into orders as soon as the new pricing system has been thoroughly digested.

Cleveland — Business in commercial and alloy steel bars eased slightly the past week. July's outlook is speculative, since while the normal trend would be downward, some sellers anticipate a contra-seasonal response to lower prices. Low inventories aid the latter expectation, but the absence of material improvement in operations of miscellaneous consumers tends to postpone the resumption of more active demand at the moment.

Chicago — Commercial bar sales are lighter, the decline being attributed to buyer hesitancy resulting from complexities of new prices. The current slump is regarded as only temporary, with some revival expected to accompany clarification

of the price and basing point situation.

Boston — Bar sales are light, influenced little by lower prices. Soft steel bars now are 2.62c, delivered Boston, with prices to western New England correspondingly lower as the result of the Buffalo base and elimination of differentials. Jobbers are balancing stocks, but larger consumers are buying sparingly. Alloy bar needs for shipbuilding, chainmaking and miscellaneous uses are tending upward. Airplane equipment manufacturers are busy, but forging shop demand is slack.

New York—Lower bar prices, now holding at 2.59c, New York, on a Buffalo base, have failed to stimulate volume, though part of recent inactivity is attributed to the holiday influence. Sellers are counting on a pickup in buying by automotive parts interests as the summer advances, while low stocks of jobbers and miscellaneous consumers constitute a favorable factor.

Philadelphia — Merchant bar demand expanded slightly the past week despite some confusion over prices. Warehouses are balancing stocks where necessary and certain consumers are more active, including makers of hoisting equipment, pumps, turbines and heavy machinery.

Buffalo — Bar sales are slightly heavier but whether the result of lower prices or general business improvement is not clear. Warehouse stocks are considered at a point where even a mild increase in consumer buying would automatically be reflected in mill schedules. One interest is maintaining the best operations so far this year.

Pipe

Pipe Prices, Page 75

Pittsburgh — Business in pipe and tubular goods is steady despite much uncertainty as to effect of new prices on demand. Since savings resulting from new quotations are relatively small, no marked change in buying resulting from these revisions is anticipated. One immediate effect, however, has been to cause producers to establish extensive warehouse stocks in Houston, Tex., to enable them to give the benefits of large freight rates to small lot consumers of oil country goods throughout that area. Force behind this move is that formerly small lots were quoted on a rail base from Pittsburgh in order to overcome handling costs. Under the present setup all lots will be given the barge rates with products moved by barge to warehouses at Houston and, as formerly, at Memphis.

Cleveland—Cast and steel pipe for public projects is more active, but steel pipe jobbers report no betterment in shipments resulting from lower prices. Market interest is centered on a waterworks at Mentor, O., bids July 18, with similar projects due for bids later this month at Portage Lakes, Mt. Pleasant, Lake More, Smithfield and Akron, O. Industrial pipe requirements remain at a minimum.

Chicago—Reduction of $2 a ton in Gary, Ind., base on standard butt-weld pipe narrows the spread between here and Pittsburgh-Lorain to 1 point or $2 a ton. Discounts at Gary formerly were 2 points less than at the eastern points. Seamless and lapweld pipe are not affected by this latest cut, continuing 2 points less discount than at Pittsburgh and Lorain. The revision follows the general reduction July 1 on both butt and lapweld standard pipe as well as other tubular products.

Boston—Cast pipe purchases are

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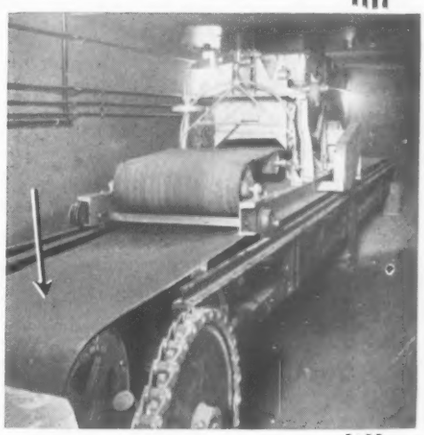

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estimated at 1000 tons, the bulk being included in Hartford, Conn., and Boston requirements, 485 tons for the latter being placed through the procurement office, treasury department. Lower prices on black and galvanized steel pipe have failed to stimulate sales, being held back by lack of building.

New York — Reflecting partially the recent $4 price reduction, the larger part of 8810 tons, 6 to 20-inch, cement lined cast iron pipe for New York on which bids closed last week brought a low bid of $52.45, delivered. Quotations on some sizes were still lower, notably $51.93 for 8-inch, but most of this order, the largest in the East in several years, will go to United States Pipe & Foundry Co. at $52.45. This interest was low on 4995 tons, 6 to 20-inch. Other apparent low bidders were Florence Pipe Foundry & Machine Co. on 2820 tons, 8-inch, and Donaldson Iron Works on 995 tons, 16-inch. Except for this opening, inquiry is light though somewhat more active for small lots.

About 1500 tons of steel pipe are being figured for the Metropolitan Life Insurance Co. housing project here, on which Starrett Bros. & Eken, New York, are general contractors. Other housing projects are expected to develop additional pipe business later, and merchant pipe demand in general is the best in several weeks, due largely to building needs.

Birmingham, Ala.—The pipe market probably presents the most potentially optimistic picture for the industrial district. Tonnage for June was somewhat less than that of May, but July is expected to run considerably ahead. Some WPA business is developing, and local plants report a gradual but consistent reduction of stocks. Production remains on a curtailed basis.

Seattle — Spokane opened bids this week for 275 tons of 6-inch cast iron pipe. Unnamed interests have been awarded 100 tons of 6 and 8-inch for Central Point, Oreg. No important tonnages are up for figures but prospects have improved with allocation of federal funds, many nearby cities planning improvements, among them Enumclaw and Goldendale, Wash., the latter expecting to double reservoir capacity and install four miles of new cast iron mains. Stevenson, Wash., will require 4000 feet of 3½ and 6-inch pipe. Lexington, Oreg., has asked PWA funds for a proposed extension. Oakdale, Wash., has WPA approval for a $11,600 project. Seattle has authorized the Twenty-fourth avenue SW improvement, estimated at $14,170.

San Francisco — Featuring the cast iron pipe awards for the last week of the first part of the year were 1650 tons of 2 to 18-inch pipe for Redding, Calif., let to United States Pipe & Foundry Co. and 100 tons of 12 to 20-inch pipe for Lewiston, Idaho, taken by Pacific States Cast Iron Pipe Co. Awards aggregated 2875 tons and brought the year's total to 17,707 tons as compared with 17,852 tons for the corresponding period in 1937.

Cast Pipe Placed

1650 tons, 2 to 18-inch, Redding, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

1000 tons, 12-20-inch, Lewiston, Idaho, to Pacific States Cast Iron Pipe Co., Provo, Utah.

350 tons, 8 and 12-inch, Boston, to United States Pipe & Foundry Co., through procurement office, treasury department, Washington.

125 tons, 4 and 6-inch, Highland Park Utility District, Bakersfield, Calif., to unnamed interest.

100 tons, 2 and 4-inch, specification 3764, Los Angeles, to Pacific States Cast Iron Pipe Co., Provo, Utah.

Cast Pipe Pending

8810 tons, 6 to 20-inch, cement-lined, cast pipe, New York City; United States Pipe & Foundry Co., Burlington, N. J., low on 4995 tons, 6 to 20-inch; Florence Pipe Foundry & Machine Co., Florence, N. J., low on 2820 tons, 8-inch; Donaldson Iron Works, Emaus, Pa., low on 995 tons, 16-inch. Florence Pipe Foundry & Machine Co. also low on 636 tons fittings, Ramapo Foundry & Wheel Works, Ramapo, N .Y., low on 201 tons.

156 tons, 4 to 8-inch, Santa Monica, Calif.; American Cast Iron Pipe Co., Birmingham, Ala., low.

Steel Pipe Pending

1500 tons, miscellaneous merchant pipe, housing project, Metropolitan Life Insurance Co., New York; Starrett Bros. & Eken, that city, general contractors.

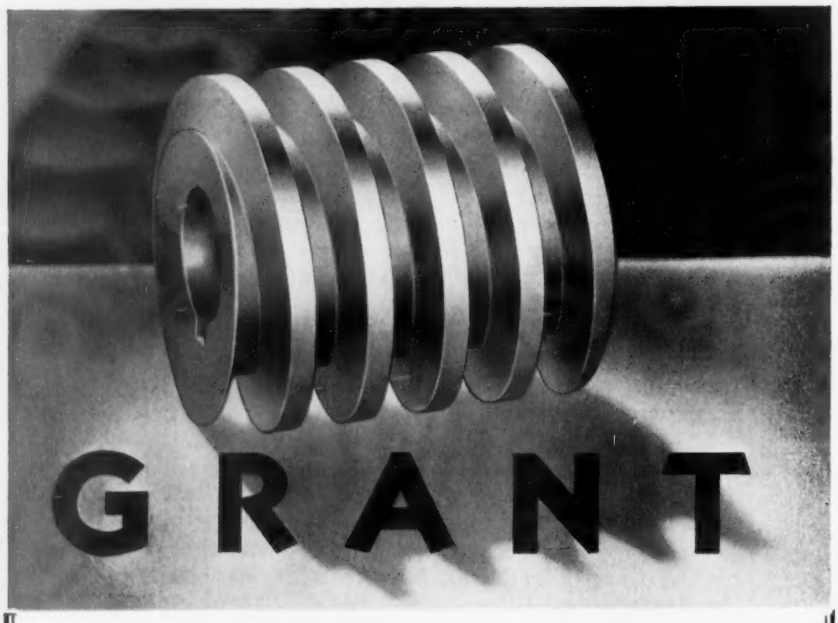
Unstated tonnage, 200 feet of 8-inch, 31,870 feet of 6-inch, 12,920 feet of 12-inch and 1660 feet of 2-inch, water works project, Mentor, O.; bids July 18, cast, steel or transite alternates.

Unstated tonnage, 24 and 30-inch, cast or steel pipe, water main project, Akron, O.; bids soon, PWA project.

Cold-Finished

Cold-Finished Prices, Page 75

Pittsburgh—Some additional automotive releases of cold-finished bars have been received, while some small purchases for 1939 models are indicated. Jobber demand is encouraging, more frequent orders for carload lots having been received. This situation is attributed to low inventories and to the belief that prices have reached bottom for the present.



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Wire

Wire Prices, Page 75

Pittsburgh—The wire market still is unsettled as new prices have created a new competitive situation in some localities and consumers are determining whether their sources of supply will necessarily be changed or not. Meanwhile buying is light, but there are indications of better demand with clarification of prices. Little buying for 1939 automotive production is noted.

Cleveland—Business in merchant and manufacturers' wire so far has received little stimulation from lower prices. Confusion resulting from uncertainty as to eventual location of some basing points has deterred demand, although sellers point out heavier buying awaits better operations among major and miscellaneous consumers. With stocks of both users and jobbers low, the reduction in prices involved only a moderate mark-down of inventory values. Mill operations remain unsteady due to the small volume of specifications.

Chicago — Consumers of wire and wire products are slow to increase purchases, following recent price reductions. Diversified sources, including kitchenware and novelty manufacturers and makers of miscellaneous products, account for much of present business which is holding about the level of late weeks. A pickup in automotive buying awaits start of work on new models, probably not until September.

Boston — Delay in determination of prices on many wire specialties produced in New England has helped to retard business and sales have not recovered fully from the slump experienced at the time of first announcement of revisions. Rods, bright wire and spring wire as well as numerous specialties are not materially changed in price relationship in competition in New England with outside mills. However, mills in this district are affected in midwestern competition as a result of abandonment of differentials at various basing points.

Birmingham, Ala.—Wire and wire products are maintaining the increase evident last week, and there is a sprinkling of new business from miscellaneous sources.

New York — Wire buying here is light, with prices yet to be adjusted on a number of products, principally specialties. This situation and low consumption has tended to restrict purchases to immediate needs despite the fact inventories of many users are the lowest in a long period. Light stocks will force such consumers into the market shortly. Wire rods are one exception in this respect, heavy purchases late last year resulting in substantial stocks at a number of plants.

Rails, Cars

Track Material Prices, Page 75

Most sellers of car steel believe distribution of more than 80,000 tons for the Southern Railway list of 5500 cars is near at hand. Car builders, who were awarded tentative contracts last May, have passed along to the Southern Railway the advantage of the recent sharp reductions in steel prices, and within the past few days the RFC has approved the terms of financing, leaving the matter now entirely in the hands of the ICC, which is expected to take action almost momentarily; and it is generally believed that action will be favorable.

So much delay has attended the formal approval of the Southern Railway's distribution, however, that some car steel sellers are still keeping their fingers crossed as to the possibility of prompt action.

Granting of an increase in passenger coach carriers to eastern railroads, estimated to yield $30,000,000 additional revenue annually, is expected to provide a slight stimulus to railroad equipment buying, which may be reflected later in the year. However, equipment sellers do not place too much store on the influences of this development.

Meanwhile, equipment buying is negligible, with the Pressed Steel Car Co., McKees Rocks, Pa., low on 50 box cars and the Gregg Co. Ltd., New York, low on 50 flat cars for the Manila Railway, 17 Battery Place. As bids on this equipment have just been submitted, they provide for the recent revisions in steel prices.

The domestic freight car awards in June involved 170 units, a sharp decline from the preceding month, when 6014 freight cars were placed by domestic lines, a total that included the 5550 freight cars for the Southern Railway. Of last month's total 100 were flat cars to be built by the Missouri Pacific in its own shops.

The total for the first half amounted to 7013, against 46,078 in the corresponding period of 1937, 28,109 in the first six months of

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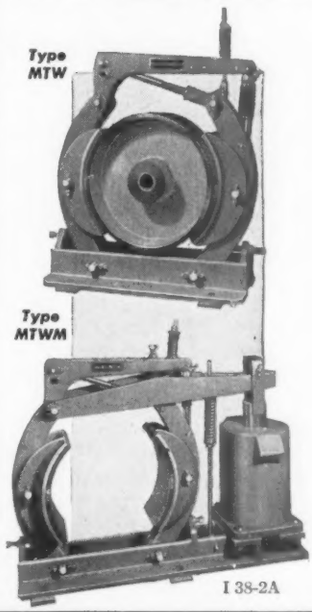

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HOTEL CLEVELAND Cleveland

1936 and 6333 in the same period in 1935.

	1938	1937	1936	1935
Jan.	25	17,806	2,050	24
Feb.	109	4,972	6,900	806
March....	680	8,155	632	0
April.....	15	9,772	4,427	350
May.....	6,014	4,732	8,900	2
June	170	548	5,200	5,151
6 mos.....	7,013	46,078	28,109	6,333
July	.....	1,030	7,229	500
Aug.	.....	1,475	225	200
Sept.	.....	1,216	1,750	875
Oct.	.....	1,355	2,210	1,250
Nov.	.....	275	1,550	100
Dec.	.....	275	23,450	10,050
Total .	.....	51,611	64,643	19,308

Locomotive demand is negligible. The Bethlehem Steel Co. is reliably reported to have booked the steel requirements for the 50 special type bulk cement cars recently noted as placed by the Lehigh & New England with the American Car & Foundry Co.

Car Orders Placed

Bethlehem Mines Corp., seven air-dump cars, to Austin-Western Road Machinery Corp., Aurora, Ill.

Car Orders Pending

Manila Railways, 17 Battery place, New York; Pressed Steel Car Co., McKees Rocks, Pa., low on 50 box cars, and Gregg Co. Ltd., New York, low on 50 flat cars.

Buses Booked

A.c.f. Motors Co., New York, 10 coaches powered with Hall-Scott horizontal engines, five for the Florida Motor Lines Corp., Jacksonville, Fla.; four for the Carolina Coach Co., Raleigh, N. C.; and one for the Plymouth & Brockton Street Railway, Plymouth, Mass.

Shapes

Structural Shape Prices, Page 74

New York—Subway requirements approximate 11,000 tons, new inquiry involving 2300 tons, closing July 19, bids being in on the remainder. Three sections are included, all in Brooklyn. Structural inquiry mounts steadily and includes 2500 tons for two public schools, Brooklyn, closing July 12. Bridge and highway work in New York city approximates 3000 tons, but normal bridge needs for upstate lag. Awards for the time being are smaller, but include 1290 tons for a tunnel ventilation building to be fabricated by the Allentown, Pa., shop.

Pittsburgh — Influence of new prices on activity in the structural shape market here still is awaited. New work is cominng out in fair total, and awards recently have been rather numerous although tonnages involved are small. Largest of new projects is 2500 tons for a New York subway. For a vocational high school, Canton, O., 1500 tons remains to be placed.

Cleveland — While new inquiries for fabricated shapes are light, a few outstanding projects are pending. Among these is the Timken Technical high school, Canton, O., involving 1200 tons, and the cloverleaf development near Brecksville, O., requiring 1350 tons. Fabricators anticipate no real improvement in inquiries until prices are clarified.

Chicago — Orders for fabricated shapes are slightly heavier, but new inquiries are slow and unimproved. Few large projects have appeared in the immediate district, principal items being 6000 tons for a bridge in California, 1230 tons for a New Orleans viaduct, and 1200 tons for a bridge in Kentucky. Fabricators give little indication of early replenishment of stocks of plain material.

Boston — A slight increase in number of structural shape contracts includes only a few large tonnages. Inquiries, aided by government work, are moderately heavier. Fabricated structural prices continue soft, with little change since the reduction in plain material to 2.41c, Boston. This reduction of $5 a ton results from the dropping of the differential at the Bethlehem, Pa., base.

Philadelphia—Structural markets in the central east are almost devoid of activity except for 4500 tons for a bridge at Washington on which general contractors' bids are due July 8. Some private work is appearing but mostly for small lots.

Buffalo — Structural market displays a better tone with projects, both federal and private, appearing in increased numbers. There are no outstanding tonnage jobs pending. Several more central schools are expected to be awarded soon. Truscon Steel Co., Buffalo, was awarded contracts for 1060 tons of structural and 175,000 square feet of galvan-

Shape Awards Compared

	Tons
Week ended July 9.....	**13,606**
Week ended July 2.....	**25,128**
Week ended June 25.....	**11,387**
This week, 1937	**13,900**
Weekly average, year, 1937	**16,060**
Weekly average, 1938.....	**16,183**
Weekly average, June.....	**20,758**
Total to date, 1937.....	**759,769**
Total to date, 1938.....	**453,136**

Includes awards of 100 tons or more.

ized metal roof deck for the new rod and wire mills of the Wickwire Spencer Steel Co., Buffalo; John W. Cowper Co. Inc., Buffalo, is the general contractor.

San Francisco — Interest in the market now centers around the outcome of the opening of bids on July 11 for 6000 tons for the Sacramento river bridge at Redding, Calif. and on July 17 for 2000 tons for a parcel post building in Los Angeles. Robert E. McKee Construction Co., Los Angeles, is low bidder at $447,000 for a hangar at Hickman Field, T. H., requiring 1200 tons. Awards totaled 1938 tons and brought the aggregate for the first half year to 67,040 tons, compared with 112,841 tons a year ago.

Seattle — Structurals continue to lead other steel items. Marked improvement is expected shortly as several important projects should be up for figures during the third quarter. Navy department, Puget Sound Navy Yard, will open bids July 12 for 590 tons involved in a yard building. The week's awards included 320 tons to Pacific Car & Foundry Co., Seattle, for shapes required for two Washington state spans.

Shape Contracts Placed

1545 tons, bridge FAP-12, Tulsa county, Oklahoma, to Patterson Steel Co., Tulsa.

1290 tons, Manhattan ventilation building, Queens midtown tunnel, New York, to Lehigh Structural Steel Co., Allentown, Pa.; Cauldwell-Wingate Co., New York, general contractor.

1075 tons, mill building, 400 x 500 feet, Wickwire Spencer Steel Co., North Tonawanda, N. Y., to Truscon Steel Co., Youngstown, O.

1025 tons, stop log guides, bureau of reclamation, Washington, to A. J. O'Leary & Son, Chicago; spec. 781.

705 tons, bridge FAP-425-G, Reyburn county, Georgia, to Virginia Bridge Co., Roanoke, Va.

700 tons, tipple, Peabody Coal Co., Westville, Ill., to Pan-American Bridge Co., New Castle, Ind.

560 tons, high school, Wauwatosa, Wis., to Worden-Allen Co., Milwaukee.

535 tons, dormitories, Duke University, Durham, N. C., to Southern Engineering Co., Charlotte, N. C.

500 tons, buildings, state hospital, Marlboro, N. J., to Elizabeth Iron Works, Elizabeth, N. J.,; and B. Katchen Jr., Irvington, N. J., bulk of former.

410 tons, bridge 35-54-FA-146AI, Linn county, Kansas, to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

390 tons, forge and shop buildings, Hammond Spring, Ind., to American Bridge Co., Pittsburgh.

350 tons, state bridges, PWA-409-B, Austin, Colo., to Midwest Steel & Iron Works, Denver.

315 tons, dimensional mills, Kenwood Corp., Mill Creek, W. Va., to International Steel Co., Evansville, Ind.

303 tons, bridge near Delta, Delta county, Colo., to unnamed interets.

300 tons, bridge, Paloa, Kans., 150 tons to Missouri Valley Bridge & Iron Co., and 150 tons to Bethlehem Steel Ct., Bethlehem, Pa.

260 tons, nurses home, State hospital, Shelton, Conn., to Bethlehem Fabricators Inc., New York; through Smith Construction Co., Derby, Conn.

255 tons, reconstruction, Transit commission bridges, 175th and 188th street, New York, to American Bridge Co., Pittsburgh; Kenney & Finerty Co., New York, general contractors.

250 tons, bathhouse, Brooklyn, to Lehigh Structural Steel Co., Allentown, Pa.; through Line Engineering Corp., New York.

230 tons, bridge FAP-FAGM-228, Johnson county, Texas, to Mosher Steel Co., Dallas.

220 tons, state bridge, King county, Washington, to Pacific Car & Foundry Co., Seattle; T. Romano, Seattle, general contractor.

220 tons, bridge FAP-425-F, Kimble county, Texas, to North Texas Iron & Steel Co., Fort Worth, Texas.

200 tons, building, Chicago Boys' club, to Joseph T. Ryerson & Son Inc., Bethlehem Steel Co., and Inland Steel Co., through R. C. Wieboldt Co., general contractor.

195 tons, building, Eastman Kodak Co., Worlds fair, New York, to Ingalls Iron Works, Birmingham, Ala.; through Stewart Co., New York, general contractor.

185 tons, The Lodge, Williamsburg, Va., to Richmond Steel Co., Richmond, Va.

175 tons, state bridge over Licking river, Cynthiana, Ky., to American Bridge Co., Pittsburgh.

165 tons, building 28C, General Plastics Corp., North Tonawanda, N. Y., to R. S. McManus Steel Construction Co., Buffalo.

155 tons, bridge FAP-FAGH-860-A, Dallas county, Texas, to Virginia Bridge Co., Roanoke, Va.

150 tons, bridge FAGH-284-E, Hinds and Rankin counties, Mississippi, to Virginia Bridge Co., Roanoke, Va.

150 tons, state crossing Multnomah county, Oregon; to unnamed interest; Birkmeier & Saramel, Portland, general contractor.

135 tons, state bridge P-911, Moville, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

125 tons, museum, U. S. Naval Academy, Annapolis, Md., to Fort Pitt Bridge Works, Pittsburgh.

110 tons, bridge, Brooks county, Georgia, to Taylor Iron Works & Supply Co., Macon, Ga.

110 tons, bridge FAP-927, Dallas county, Texas, to Mosher Steel Co., Dallas.

110 tons, industrial arts school, Burlington, Iowa, to Des Moines Steel Co., Des Moines, Iowa.

103 tons, state highway bridge, Tioga county, New York, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, state bridge, Stratford, Wash., to Pacific Car & Foundry Co., Seattle; Goetz & Brennan, Seattle, general contractor.

Shape Contracts Pending

7000 tons, subway, section S7 and 8, route 110, Brooklyn, N. Y.; George H. Flinn Corp., New York, low; bids July 8.

3500 tons, U. S. Marine hosptial, Boston.

2300 tons, subway, section 6-A, route 110, Brooklyn, N. Y.; bids July 19, board of transportation, New York.

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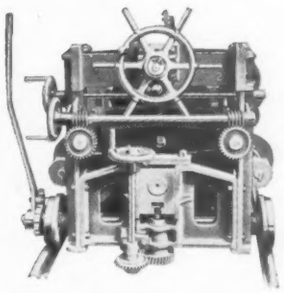

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2100 tons, high school for home-making, Brooklyn, N. Y.; bids direct on steel, fabricating and erecting, July 12, board of education, New York.
2000 tons, parcel post building, Los Angeles; bids July 17.
2000 tons, revised estimate, ramp connections, west side elevated highway, Canal street, New York; bids July 15. president, borough of Manhattan.
1230 tons, viaduct, New Orleans; bids opened July 6.
1200 tons, hangar at Hickman Field, T. H.; Robert E. McKee Construction Co., Los Angeles, low on general contract.
1200 tons, bridge over Green river, Munfordvill, Ky.
700 tons, building, for American Refrigerator Transit division of Missouri Pacific railway.
679 tons, bureau of supplies and accounts, navy department , delivery various yards; bids July 15; also 376 tons, plates, July 12, and 1186 tons, sheets; bids in July 8.
600 tons, Blue river bridge, for Kansas City Terminal railway.
590 tons, navy yard structure; bids to Puget Sound navy yard, July 12.
500 tons, addition, high school, Port Richmond, Staten Island, N. Y.; bids July 12, steel direct, fabricating and erecting, board of education, New York.
450 tons, bridge taking New York Central railroad tracks over Major Deegan boulevard, Bronx, N. Y.; bids in to borough president, Bronx.
400 tons, plate girder bridge, project F-4-E, Manchester, Iowa.
325 tons, bridge, Dermott, Ark.
302 tons, Washington state undercrossing, King county; bids at Olympia, July 19.
300 tons, bridge, Mauston, Wis.
300 tons, apartment building and garage, Chicago.
200 tons, 11 bridge decks, Marquette county, Michigan, for United States treasury department.
200 tons, grade school, Fayette county, Kentucky.
190 tons, buildings, Ancon, Canal Zone, Panama; Independent Iron Works, Oakland, Calif., low; bids June 30.
145 tons, Washington state undercrossings in Pierce and Grant counties; bids at Olympia, July 19.
138 tons, Santa Ynez river bridge, Santa Barbara county, California, for state; bids July 20.
135 tons, beam bridges, Kentucky and West Virginia, for United States treasury department.
125 tons, state highway bridge, Saukville, Wis.; bids July 12.
120 tons, prison buildings, LaGrange, Ky.
118 tons, bridge, Clerk street, Jersey City, N. J., rebid; El-Dora Contracting Co., Newark, low.

Reinforcing

Reinforcing Bar Prices, Page 75

Pittsburgh — While a more stable market is expected to follow establishment of reduced base prices for concrete bars, low quotations on a number of projects bid prior to the price readjustment cloud the situation at present. Bids on new inquiries generally are at the new 2.05c figure for new billet bars. New business is appearing steadily but few large tonnages are included, with lots of less than 100 tons comprising the bulk of pending work.

Cleveland — Estimates on reinforcing bars for private work in northern Ohio during June totaled only 372 tons, compared with 744 tons in May, and 748 tons in April, the peak for the year to date. Comparable figures for joists were 112 tons in June, 67 in May, and 127 in April. While new prices are reported fairly steady, no real test has been offered and business has failed to respond to the lower quotations. Concrete bar awards are limited to individual orders of less than 50 tons.

Boston — Placing of 700 tons of bars for an industrial building for Lever Bros., Cambridge, Mass., with Concrete Steel Co., is the leading recent purchase in New England. Small lot inquiries are more active, but few large tonnages are being estimated. At 2.41c, delivered Boston, on a Sparrows Point, Md., base, prices still are unsettled, with some business in billet bars going under that price.

Philadelphia—Concrete bar fabricators share the dullness encountered in the structural trade. Miscellaneous jobs are insufficient to bolster shrinking backlogs.

New York — Purchase of 15,000 tons for a housing project, Bronx, N. Y., is the largest contract covering reinforcing bars for building construction ever placed in this district. Similar projects, including the Red Hook and Queensbridge housing program, New York, will take an estimated 25,000 tons, bids closing July 11 on the Red Hook foundations. In addition pending requirements approximate 5000 tons of bars and close to 1000 tons of reinforcing mesh included in the New York state openings of July 7 and 12. Mesh has been reduced $6 a ton. Small lot buying is slightly more active, but contractors are still pressing for concessions even on low tonnages despite recent sharp cuts in delivered prices.

San Francisco — The outstanding award went to Bethlehem Steel Co. and involved 1669 tons for the United States Indian Irrigation service, Los Angeles. Awards aggregated 2644 tons, bringing the total for the year to 58,643 tons compared with 49,419 tons in 1937. Bids will be opened July 17 for 1000 tons for a parcel post building in Los Angeles.

Seattle — The largest tonnage pending involves 4000 tons for the reclamation bureau, bids opened at Denver June 22, Bethlehem Steel Co., low. Improved demand for con-

THE HANNA FURNACE CORPORATION
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

Concrete Bars Compared

	Tons
Week ended July 9	19,358
Week ended July 2	13,037
Week ended June 25	2,016
This week, 1937	7,083
Weekly average, year, 1937	6,266
Weekly average, 1938	6,050
Weekly average, June	4,957
Total to date, 1937	162,095
Total to date, 1938	169,405

Includes awards of 100 tons or more.

crete bars is expected during the third quarter as the government's spending program gets under way.

Reinforcing Steel Awards

1500 tons, housing project, Metropolitan Life Insurance Co., Bronx, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

1669 tons, United States Indian Irrigation service, Los Angeles, to Bethlehem Steel Co., Los Angeles.

700 tons, industrial building, Lever Bros., Cambridge, Mass., to Concrete Steel Co., New York; Stone & Webster, Boston, engineers and contractors.

534 tons, hospital, Springfield, Ill., to Missouri Rolling Mill Corp., St. Louis.

300 tons, intercepting sewer, Bronx, N. Y., to Carnegie-Illinois Steel Corp., Pittsbuhgh; through Arthur A. Johnson Corp., New York.

240 tons, mostly mesh, two contracts, highway sections, Hamden, Conn., to Truscon Steel Co., Youngstown, O.; through M. A. Gammino Construction Co., Providence, R. I.

234 tons, highway bridge, Bixby, Okla., to Mattison Steel Co., Tulsa, Okla.

221 tons, United States engineer office, spec. 595, Los Angeles, to unnamed interest.

209 tons, U. S. engineer, Huntington, W. Va., to the West Virginia Rail Co., Huntington, W. Va., at 2.15c, delivered, discount ½ per cent B. P. V., contract at $8987; bids June 28, pro. 180.

150 tons, building, Veterans hospital, Knoxville, Iowa, to Joseph T. Ryerson & Sons Co., Chicago; through John E. Ericsson Co., Chicago, general contractor.

110 tons, pier substructures, Passaic river bridge, Hudson and Essex counties, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.; through Senior & Palmer Inc., New York, general contractors.

Reinforcing Steel Pending

1000 tons, parcel post building, Los Angeles; bids July 17.

650 tons, U. S. dam, Whitney Point, N. Y.; bids July 28 to U. S. engineers, Binghamton, N. Y.

478 tons, foundations, Red Hook housing project, Brooklyn, N. Y.; bids July 11.

350 tons, subway section 6-A, route 110, New York, bids July 18.

152 tons, Washington state highway projects; bids at Olympia, July 19.

148 tons, San Joaquin river bridge, Merced county, California, for state; bids July 20.

128 tons, paving and miscellaneous construction, approach, Lincoln tunnel, Kings Bluff, Weehawken, N. J.; Joseph L. Sigretto Contracting Co., New York, low.

125 tons, mostly mash, highway project, Camden county, New Jersey; Edward H. Ellis Co., Westville, N. J., low.

103 tons, Santa Ynez river bridge, Santa Barbara county, California, for state; bids July 20.

100 tons, reinforcing and miscellaneous, Owyhee project; bids to bureau of reclamation, Boise, Idaho, July 18.

Pig Iron

Pig Iron Prices, Page 76

Pittsburgh — A slight pickup in pig iron buying has yet to be followed by heavier shipments. What orders have appeared lately are attributed only in part to the recent $4 price reduction. Narrowing in the spread between pig iron and No. 1 heavy melting steel from $14 to $6 the past few weeks is encouraging to iron sellers here. Some blast furnaces banked over the holiday remained down last week to give workers a vacation.

Cleveland — Pig iron bookings for third quarter have spurted here, following the recent $4 reduction in prices. Improvement in buying is well diversified but is not matched by similar gains in releases. Foundry operations continue light, and with prompt deliveries available there is little incentive to buy for stock. Lower prices are placing a serious handicap on some high-cost producers.

Chicago — Despite absence of improvement in foundry operations, pig iron sales have increased following the recent price cut of $4 a ton. June shipments were about 20 per cent behind May, but July is expected to show an upturn. Deliveries to some foundries lately have lagged behind consumption, a situation being corrected by the decline in inventories.

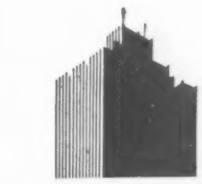
Boston—Only slight gains in pig iron buying have followed the recent $4 price reduction. Already some pressure for lower casting prices has appeared, but heavy costs elsewhere make it difficult for foundries to pass on all of the saving, particularly since scrap prices are rising. Furnaces outside New England feel new base prices are too low, and there has been some talk of a $1 to $2 rebound.

New pig iron prices evidently were not quoted on a navy letting July 5, involving nearly 500 tons of foundry iron. On one 79-ton lot for Boston, producers quoted $29.97, delivered, and $32.85 on a smaller lot, while for Norfolk delivery, $29.66 was named. Only bid on 50 tons of charcoal iron for Washington delivery was $37.09.

New York—Pig iron orders are more numerous, principally in small lots and from smaller foundries, though larger consumers show more interest. Vague reports of a possible $1 to $2 price increase, coming on the heels of the recent $4 reduction, are stirring interest of users in the market. Some producers are said to be seriously considering early restoration of part of the recent price cut. Export buying still lags despite better inquiry lately.

Cincinnati—Pig iron buying is more active since the $4 price reduction though melters are reluctant to order far ahead. Foundry operations are slow, being affected by vacations.

Philadelphia—Central eastern pig iron sellers have failed to experience the business pickup noted in



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the Middle West but report some customers now placing two cars where orders previously were limited to one. The foundry melt is unimproved.

Buffalo — Pig iron shipments are slow to improve despite a rush on the part of foundries to enter third quarter contracts. With inventories low and a trifle apprehensive that part of the $4 price cut be withdrawn, consumers are willing to make sizable forward purchases.

St. Louis—Response of melters to the $4 reduction in pig iron has exceeded expectations, purchasing being the heaviest since early last year. While orders have been principally in 100 to 1000-ton lots, several commitments for as much as 2000 tons are noted. In the belief that no further cut is in prospect soon, foundries are disposed to cover full third quarter requirements.

Birmingham, Ala.—The week just passed has developed further the optimistic outlook for southern pig iron, although there have been no spot developments to indicate an increase in melt immediately. Some new inquiries are in and reports are heard another blast furnace will be blown in before the end of the month. Five stacks are in production in the district. Melters expect the price cut to bring sufficient business to warrant the reduction.

Toronto, Ont. — Following the holiday last week, which tended to slow down business in the steel markets, demand for merchant pig iron is swinging back to normal and local blast furnace representatives state that sales again have passed the 2000-ton mark with sales in lots of 50 to 400 tons. A number of melters have closed contracts for third quarter and awards on this account are slightly in excess of those for the past quarter.

Scrap

Scrap Prices, Page 78

Pittsburgh — Scrap continues strong despite absence of active demand from consumers. At the same time brokers are covering previous sales at prices equal to or above the current consumers' market. Heavy melting steel continues $13 to $13.50 following a recent sale of about 5000 tons at a reported price of $13.25. No. 2 steel is unchanged at $11.50 to $12. Some other grades are higher, low phosphorus billet and bloom crops now being $16 to $16.50. No. 1 cupola cast is up to $14 to $14.50, but heavy breakable cast is unchanged at $12 to $12.50.

Cleveland — Few transactions in iron and steel scrap are taking place currently. With the scrap market definitely in the hands of the dealers, unwilling to sell at present prices, it is a question of waiting until the markets reach such levels as will cause dealers to unload. But most scrap consumers still have on hand fair-sized stocks since at today's operating rates these consumers are using it up slowly.

Chicago — While heavy melting steel nominally is $11 to $11.50, tonnages apparently are not available at that range. The trade regards it not unlikely subsequent mill buying will be at $11.75 or $12 unless consumers remain out of the market longer than anticipated. Prices are up 50 cents a ton on a number of grades, including compressed sheets, railroad steel specialties, short rails and low phos grades.

Boston—With resistance to rising prices for export scrap growing, a spread in quotations on active grades has developed. While $9.50 and $10.50, dock, is offered for heavy melting by some brokers, others are seeking tonnages at $9 and $10. Some are reluctant to better $7, dock, for stove plate, against $7.75 bid in other quarters. Better demand from eastern Pennsylvania has stimulated and strengthened the domestic market, with prices higher on a number of grades.

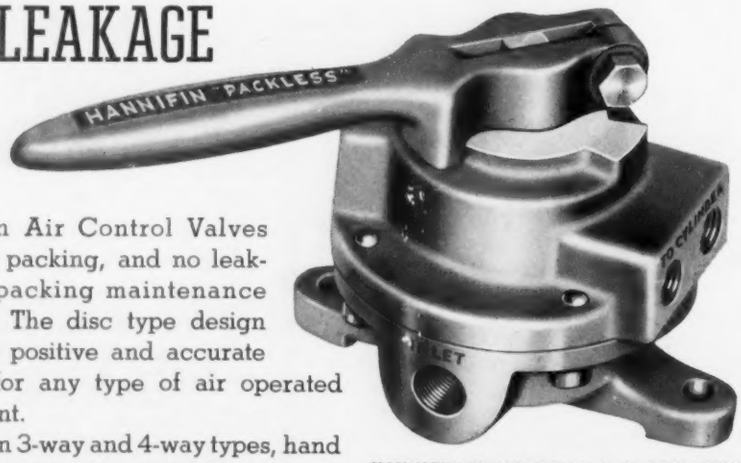
New York — Continued strength in prices paid for scrap for barge delivery for export has much of its inception in the last export sale of about 370,000 tons, a large part of which remains to be shipped. Sold at $10, f.a.s., for No. 1 heavy melting steel, the price has advanced to $10.50, barge, with one broker reported paying $11. Domestic shipments are heavier, with more eastern consumers buying small lots and issuing larger releases against old orders. For No. 1 steel, $10.50 is being paid, f.o.b. northern New Jersey.

Philadelphia — Scrap continues strong, largely as the result of short covering, although some business has been done in the principal grades. No. 1 steel has been closed at $13.50 with brokers offering $13 and therefore strong in the quoted range. No. 2 steel is $12 and specialties $17, all representing an advance of 50 cents. Some grades are nominal, due to lack of interest, although some coverage, especially among foundries, is anticipated. The situation is being watched closely for possible top heaviness in prices, since steelmaking operations are not increasing proportionately.

Buffalo — Inquiries for scrap are heavier, but buyers and sellers have found it difficult to reach agreement on prices. Quotations have strengthened in recent weeks, but consumers are attempting to obtain scrap at levels prevailing before the present price rise. Foundries are back in the market, with additional sales anticipated shortly.

Detroit — Prices continue strong, and bundles, loose clippings, long turnings and No. 1 busheling are up about 50 cents. Dealer activity has been responsible for the bullish situation, little buying having appeared from consumers. Automotive scrap lists are not looked for until the end of the month. A small ton-

NO LEAKAGE



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HANNIFIN "Packless" AIR CONTROL VALVES

nage of forge flashings from Flint was up for bids last week, this material being quoted $7.25 to $7.75.

Cincinnati—Prices have advanced 50 cents a ton on most scrap grades here. Some desultory buying is being done by consumers, but mill stocks make unnecessary the making of heavy commitments. Blast furnace grades are less active, and foundries are practically out of the market.

St. Louis—Influenced by strength in eastern markets and by more active demand from dealers, iron and steel scrap prices here are stronger. Advance of 50 to 75 cents a ton in heavy melting steel has failed to bring out substantial tonnages, offerings having declined the past two weeks. Car wheels, brake shoes and several other specialties are scarce in the face of rising prices. Consumer buying remains light and is expected to continue slow the balance of this month. Railroad offerings include 1500 tons by the Nickel Plate and 500 tons by the St. Louis & Southwestern.

Birmingham, Ala.—No evidence of unusual activity is reported in the scrap market despite the adjustment in heavy melting steel and the general air of expectancy evident for the past few days. The market evidently is awaiting reaction to the drop in pig iron prices.

Toronto, Ont. — Trading in iron and steel scrap is spotty to dull. A few special lines have a strong market demand while other grades are at a standstill. Heavy melting steel is in demand with dealers making occasional shipments to the Hamilton mills. Turnings have started to show some interests while other steel lines are practically at a standstill. Foundries are in the market for machinery cast and dealers state there is a waiting demand for all this material they can procure.

Warehouse

Warehouse Prices, Page 77

Pittsburgh—There is a good possibility that new quantity differentials will be made effective in this district within the next few days, followng action taken by warehouses at other points, including Cleveland, Buffalo, Cincinnati and Detroit. No definite action has as yet been taken but it is expected momentarily.

Cleveland—Light requirements of consumers more than offsets what stimulus has been provided by lower prices and warehouse sales here remain slow and generally unimproved. June shipments fell below May and a further reduction is regarded not unlikely this month. Announcement still is awaited on expected revision in quantity differentials.

Chicago — Decline in June sales was somewhat less than seasonal, but little improvement is in early prospect since business usually holds about even through June, July and August. Warehouses expect new low prices to be without stimulating effect for the present at least.

Boston — Further minor adjustments are expected to follow recent reductions of $4 to $8 a ton on principal products. Galvanized sheets are down $8, blue annealed sheets $7, hot-rolled bars and cold finished rounds and flats $5.30 and cold-rolled strip, shapes and plates $5. Business is improved slightly.

New York—Warehouses continue to revise prices, plates being quoted 3.76c for 400 to 1999 pounds in the quantity classification plan recently adopted. Floor plates are 5.56c; galvanized sheets, No. 24 to 30 inclusive 4.40c and 10 to 22 gauges inclusive 4.65c. Galvanized copper alloy sheets, No. 10 to 30 gauges inclusive are revised to 4.90c. Lower prices have not as yet increased demand, buying being confined mostly to small lots.

Philadelphia — Business holds at about the level of the past two weeks, with moderate improvement expected to follow clarification of prices. Several price adjustments still pend, while reductions have been made on a number of products.

Cincinnati — New warehouse prices, reflecting mill revisions, are being placed in effect. The new Middletown, O., base has been ignored thus far in fixing jobber quotations. Sales have improved slightly, business currently being about equal to the rate a month ago.

St. Louis—While hot weather and the holiday tended to restrict warehouse business, sales are fairly steady. Some railroads have been better buyers in anticipation of reopening of shops. Building materials are slow and in small lots, while oil country goods continue active. Little change in business is attributed to lower warehouse prices.

Ferroalloys

Ferroalloy Prices, Page 76

New York — Ferromanganese buying lags behind despite the recent reduction to $92.50, duty paid. A definite pickup in steelmaking is felt necessary to stimulate movement of ferromanganese, with much the same situation true of spiegeleisen. The latter is holding at $28, Palmerton, Pa., on 19 to 21 per cent material, a reduction of $5 a ton from the former price, and at $33 on 26 to 28 per cent material, a cut of $6.

Ferrotungsten is easier at $1.60 to $1.65 a pound, tungsten contained in carlots, with some shading noted below this spread. Weakness reflects continued lack of demand from tool steel manufacturers.

New York — Silicon briquets, contract shipments, have been reduced to $69.50 a ton from $74,

f.o.b. Niagara Falls, N. Y., in carload lots. Spot lots are now $74.50, down from $79 and less than car lots are 3.75c a pound, down from 4.00c. A leading seller has reduced 26-28 per cent spiegeleisen $6 a ton to $33, Palmerton, Pa., the 19-21 per cent grade being $28 a gross ton, Palmerton.

Iron Ore

Iron Ore Prices, Page 78

Cleveland — Shipments of iron ore from upper lake ports during June amounted to 2,837,745 tons, compared with 10,107,883 tons a year ago, a decrease of 71.9 per cent, but a slight increase over the 1,180,703 tons brought down in May this year. Shipments for the season to July 1 amounted to 4,278,962 tons, against 23,922,294 tons to July 1, 1937, a decrease of 82.1 per cent.

Shipments for the season to July 1 in 1938 and 1937, as tabulated by the Lake Superior Iron Ore association, follow:

Port	To July 1, 1938	To July 1, 1937
Escanaba	160,566	1,236,866
Marquette	178,062	1,851,167
Ashland	418,070	1,876,066
Superior	1,641,804	8,151,535
Duluth	916,675	6,881,747
Two Harbors	963,785	3,924,913
Total	4,278,962	23,922,294

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 75

Bolt and nut prices have been reduced through an additional 5 per cent discount from list. A week ago rivet manufacturers took similar action on small rivets and lowered large sizes $4 a ton. The bolt and nut price cut is in line with reductions previously effected on steel bars, wire rods and bolt wire. Pittsburgh, Cleveland, Chicago and Birmingham, as previously, are basing points. While bolt and nut demand lately has been fairly steady in some districts, improvement in buying is expected to result from clarification of prices. Lower quotations were in prospect for some time and jobbers had refrained from adding to stocks. Consumers also have been ordering only for prompt needs. Automotive buying for new models has yet to reach significant proportions.

Steel in Europe

Foreign Steel Prices, Page 77

London — (*By Cable*) — Richard Thomas & Co. is planning a £6,000,000 development of its works at Redbourne, Scunthorpe, Lincolnshire, and Ebbw Vale, Monmouthshire. Financing has been completed by a number of banks, including the Bank of England, which will share in control.

Markets in Great Britain continue dull as regards new business. Another east coast blast furnace is blowing out. Little expectation exists of trade revival before the end of the summer but the general trade outlook is slightly more promising.

The Continent reports continued dull export trade. Business is almost entirely for immediate requirements, possibly indicating low stocks.

Metallurgical Coke

Coke Prices, Page 75

By-product foundry coke prices have been reduced at certain points, following the drop in pig iron quotations. At Cincinnati, a 75-cent cut brings the market to $9.75, delivered there. Indianapolis ovens have lowered the market 50 cents to $10, delivered.

Steel Imports of Week

Philadelphia—More than 100 tons of miscellaneous steel products arrived here during the week ended July 2, including 23 tons steel bars, 30 tons steel tubing and 27 tons steel forgings from Sweden; 24 tons steel bars, 23 tons steel angles from Belgium and 502 tons chrome ore from South Africa.

Australia Embargoes Exports of Iron Ore

■ Exports of iron ore from Australia were prohibited effective July 1, according to an announcement by the Australian prime minister reported to the department of commerce. The measure was taken to conserve Australia's mineral resources.

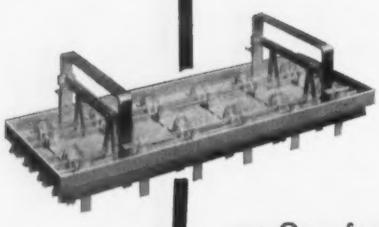
Local observers stated that the decision will not only mean a cessation of exports from South Australia, the only exporting region, but will cause abandonment of the development of the Yampi Sound deposits.

In a recent report the commonwealth geological advisor stated that it is economically impossible to consider deposits in Australia of less than about 20,000,000 tons of high-grade ore, free from impurities.

Canadian Imports Lower

■ Iron and steel imports into Canada in May totaled $17,168,000, compared with $21,863,000 in May, 1937. Value of imports from the United States dropped from $17,601,000 to $13,471,000.

Machinery, the principal item, had a value of $2,986,000, against $3,708,000. Other imports from the United States included automobile parts, $2,278,000; farm implements, $2,157,000; automobiles, $1,873,000; plates and sheets, $754,000; engines and boilers, $585,000; rolling mill products (miscellaneous), $486,000; tubes and pipes, $157,000; castings



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and forgings, $147,000; stamped and coated products, $144,000; tools, $125,000.

Nonferrous Metals

New York — Nonferrous metal markets opened active and strong on Tuesday following the holiday on Monday then entered a period which is commonly described as a "consolidation of gains."

Copper—Prices advanced ¼-cent per pound on Tuesday to the basis of 9.75c, Connecticut. All allied products, including wire, brass ingot, etc., advanced proportionately. This brought the total advance since the uptrend began to $15 per ton. Sales for the week ended July 2 were reported at 118,660 tons, more than the total for the first five months. Buying pressure lifted as the week advanced and by the close export had dropped to 9.60c, c.i.f.

Lead—Prices advanced $3 per ton on Wednesday to the basis of 4.75c, East St. Louis, and 4.90c, New York. This brought the total advance since June 21 to $18 per ton. Offerings at the new level were freer but sales declined since consumers' needs are now well covered ahead.

Zinc—Prime western held steady at 4.75c, East St. Louis, despite buying which was only about half that of the previous week. The statistical report which revealed a near-balance between production and shipments during June strengthened sentiment. Consumers' needs generally are covered through the second quarter.

Tin—After holding fairly steady at the high levels attained in London over the July 2 week-end, the market reacted sharply on Friday, due mainly to heavy liquidation of speculative holdings. The domestic market also declined, closing at around 42.60c on Straits spot, the lowest recorded since June 29.

Equipment

New York—Harnischfeger Corp., Milwaukee, at $42,780, has been awarded the contract for two 20-ton gantry cranes with lifting beams and track bumpers for the Chickamauga and Guntersville power plants, awarded June 29 by the Tennessee Valley authority, Knoxville, Tenn.

Seattle — Mining activity at Good News Bay, Bethel and other Kuskokwin river, Alaska, districts, is in full swing and considerable heavy equipment has been shipped from here. This week several tractors and a Seattle-built drag line outfit, weighing over 50 tons, went to Good News Bay for the New York-Alaska Gold Dredging Co.,

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

July	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
2	9.50	9.62½	9.02½	44.00	44.20	4.75	4.60	4.75	20.00	11.25	35.00
4—Holiday											
5	9.75	9.87½	9.27½	43.50	43.80	4.75	4.60	4.75	20.00	11.25	35.00
6	9.75	9.87½	9.27½	43.50	43.80	4.90	4.75	4.75	20.00	11.25	35.00
7	9.75	9.87½	9.27½	43.65	43.95	4.90	4.75	4.75	20.00	11.25	35.00
8	9.75	9.87½	9.27½	42.60	42.90	4.90	4.75	4.75	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.75c Conn. copper

Sheets

*Yellow brass (high)	16.37½
*Copper, hot rolled	17.87½
*Lead, cut to jobbers	8.00
Zinc, 100-lb. base	9.75

Tubes

*High, yellow brass	19.12½
*Seamless copper	18.37½

Rods

*High yellow brass	12.37½
*Copper, hot rolled	14.37½

Anodes

*Copper, untrimmed	15.12½

Wire

*Yellow brass (high)	16.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

*New York	5.50-5.75
Cleveland	6.25-6.50
*Chicago	5.75-6.00
St. Louis	5.00-5.25

Heavy Copper and Wire

*New York, No. 1	7.25-7.50
Cleveland, No. 1	6.75-7.00
*Chicago, No. 1	7.25-7.50
St. Louis	6.50-6.75

Composition Brass Borings

*New York	5.00-5.25

Light Copper

*New York	5.75-6.00
Cleveland	5.00-5.25
*Chicago	5.75-6.00
St. Louis	5.00-5.25

Light Brass

Cleveland	3.00-3.25
*Chicago	3.75-4.00
St. Louis	3.00-3.25

Lead

*New York	3.65-3.90
Cleveland	3.25-3.50
*Chicago	3.75-3.87½
St. Louis	3.00-3.25

Zinc

New York	2.00-2.12½
Cleveland	2.00-2.25
St. Louis	2.00-2.25

Aluminum

Borings, Cleveland	4.75-5.00
Mixed, cast, Cleveland	6.75-7.00
Clips, soft, Cleveland	11.75-12.00
*Mixed, cast, St. Louis	6.50-7.00

SECONDARY METALS

*Brass ingot, 85-5-5-5, less carloads	10.25
Standard No. 12 aluminum	13.00-14.00

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In captivating effect—both milady's modern coiffure and SUPERIOR STAINLESS STRIP strive for a single objective—to win *superior* acclaim . . . And stainless steels have accomplished much along these lines via a close adherence to metallurgical perfection and a non-corrosive, flawless finish.
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SUPERIOR STEEL CORP.
Executive Offices: Grant Bldg. Pittsburgh
General Offices and Works: Carnegie Pa.

Clyde Equipment Co., Seattle, forwarded a Bucyrus bucket dredge to Bethell. Demand from industrial sources is spotty, most being for public works. Reclamation bureau will receive bids at Denver July 19 for furnishing plate steel pump discharge manifold for the Owyhee project and July 20 for radio telephone system for the Yakima project. Longview, Wash., plans to buy seven school buses. Spokane has opened bids for 2600 feet of underground cable. United States engineer, Portland, Oreg., is considering tenders received July 7 for furnishing a 2-ton crane, shackles, wire rope, etc.

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No more confusion over code numbers because PAINTCIL doesn't run, drip or burn. No more expensive re-establishing of lost identity, because markings never fade or become indistinct. Marked with PAINTCIL, steel *stays marked.*

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Construction and Enterprise

Ohio

PAINESVILLE, O.—City, W. L. Clipp, clerk, soon lets contract for constructing one-story, 50 x 80 foot turbine room addition, and 15-ton crane for light plant. Cost $40,000. H. R. Hadlow, 700 Prospect avenue, Cleveland, is engineer.

TOLEDO, O.—Great Lakes Coca-Cola Bottling Co., 1235 Summit street, plans installation of power equipment in new one and two-story bottling plant at 201 Sylvania avenue. Cost close to $145,000. Work to begin at once. C. B. Elliott is general manager. (Noted May 30).

WELLSTON, O.—City plans improving municipal light plant, including installation of new 1000-kilowatt turbine and two boilers. Cost $125,000. H. R. Lasley, director of public service. H. Frantz is city engineer.

WOOSTER, O.—Wooster college has plans by W. E. Reed, architect and engineer, Union Trust building, Pittsburgh, for constructing power plant. Cost $200,000.

Connecticut

NEW BRITAIN, CONN.—City, G. J. Coyle, mayor, City hall, is seeking federal aid to construct and equip municipal power plant, cost of which is estimated at $40,000. (Noted May 30).

Massachusetts

WESTON, MASS. — Massachusetts Broken Stone Co., Waltham, Mass., is considering rebuilding portion of diesel engine-electric plant at Stonybrook, near Weston. (Noted June 13).

New Jersey

GREYSTONE PARK, N. J.—Institutions and Agencies, Trenton, N. J., will soon let contract for turbine, 500-kilowatt condensing bleeder turbo-alternator, and one surface condenser and auxiliaries for New Jersey state hospital. Cost $4500.

MADISON, N. J.—Farbo Co., 100 Kings road, has plans by P. H. Butler, 326 Elm avenue, Teaneck, N. J., for two-story flavoring extracts building.

Pennsylvania

EPHRATA, PA.—Borough council will purchase electrical pumping machinery and other equipment for sewage disposal plant. Cost to exceed $1000. W. A. Goff, 220 South Sixteenth street, Philadelphia, engineer.

JOHNSONBURG, PA.—Borough, H. A. Miller, secretary, plans purchasing electrical pumping machinery and equipment for municipal sewage disposal plant. Cost to exceed $1000. Perring & Remington Co., 6100 Ellsworth street, Philadelphia, engineer. (Noted April 25).

Michigan

BRIGHTON, MICH.—PWA grant has been approved for construction of waterworks and distribution system, estimated to cost $100,000. Ayres, Lewis, Norris, & May, Ann Arbor, Mich., engineers.

DETROIT—Detroit Combustion Co. has been incorporated with $50,000 capital to deal in combustion equipment. Correspondent: George D. Hatie, 2730 Union Guardian building.

DETROIT—Mar-Land Machine Products Co., 18241 Oakland avenue, has been organized with $10,000 capital to manufacture mechanical equipment; Earl W. Messerle, 19333 Hanna avenue.

NEGAUNEE, MICH.—Republic Steel Corp. has begun work of electrifying its Cambria iron mine at Negaunee. The steam hoist will be replaced by an electric hoist. Underground pumps will also be replaced.

Alabama

SHEFFIELD-TUSCUMBIA, ALA.—City, Hoyt Greer, mayor, Sheffield, will start work in 60 days on $100,000 enlargement and improvement program, financed by $55,000 PWA loan and $45,000 PWA grant.

TARRANT CITY, ALA.—Birmingham Water Works, Birmingham, Ala., plans construction of large electric-operated pumping station and new filtration plant in connection with extensions and improvements in water system at Tarrant City and East Lake. New pipe lines will be installed. Entire project to cost close to $400,000. H. B. Richards is general manager.

Maryland

GWYNNBROOK, MD.—Hunter Baltimore Rye Distillery Co., 1900 East Fort avenue, Baltimore, plans new boiler plant, 49 x 50 feet, and pumping station, 30 x 33 feet, at plant here. Cost over $50,000 with equipment. Work scheduled to begin soon. Moehle and Associates, 217 West Franklin street, Baltimore, architects. (Noted June 20).

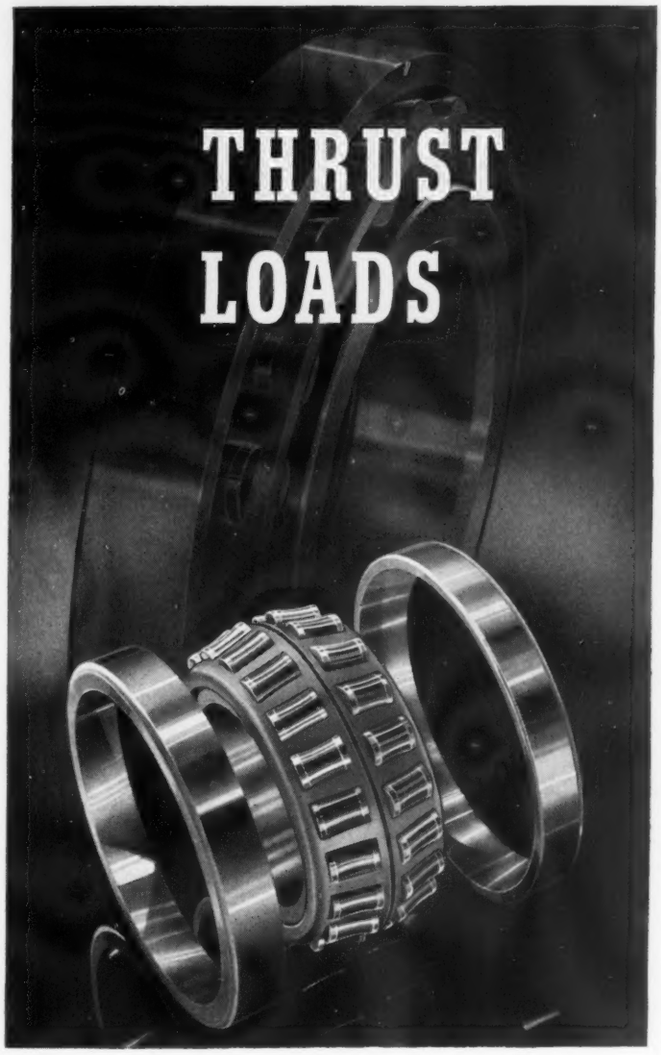
District of Columbia

WASHINGTON—Total allotments of $27,883,000 for enlargement, extension and remodeling of existing plants and facilities of the navy department were announced by the public works administration. The following allocations were made by PWA to the bureau of yards and docks, navy department, as a part of the new 1938 public works program: $100,000 for pattern storage facilities, $375,000 for improvement of power plant, and $1,100,000 for erection of foundry building at Mare Island navy yard; $110,000, improvement of power plant at Boston navy yard; $40,000, improvement of foundry buildings; $90,000, extension of electric manufacturing building, and $100,000, improvement of power plant at Portsmouth, N. H., navy yard; $560,000, extend structural assembly shop, Philadelphia navy yard; $110,000 sheet metal shop, Charleston, S. C., navy yard; $85,000, extend power plant, and $525,000 to extend crane structure over buildings ways and provide cranes at Norfolk navy yard; $550,000, improve and extend overhaul shops at naval air station, Norfolk, Va.; $430,000, additions to assembly and machine shops, naval air station, San Diego, Calif.; $16,000, erection of shop buildings and incineration, fleet air base, San Pedro, Calif.; $50,000, improvement to power plant, Great Lakes naval training station; $200,000, central heating plant, naval academy, Annapolis; $300,000, improvement of power plant, naval torpedo station, Newport, R. I.; $325,000, extension of structural shop including equipment, $275,000, extension of machine shop, $150,000, improvement of power plant, at navy yard, Charleston, S. C.

Kentucky

LOUISVILLE, KY.—John G. Epping Bottling Works Inc., 712 Logan street, plans installation of power equipment in new two-story addition to mechanical bottling plant, 30 x 125 feet, cost of which will exceed $75,000. Carl J. Epping, 806 East Broadway, Louisville, is architect. (Noted June 20).

VANCEBURG, KY. — Lake county



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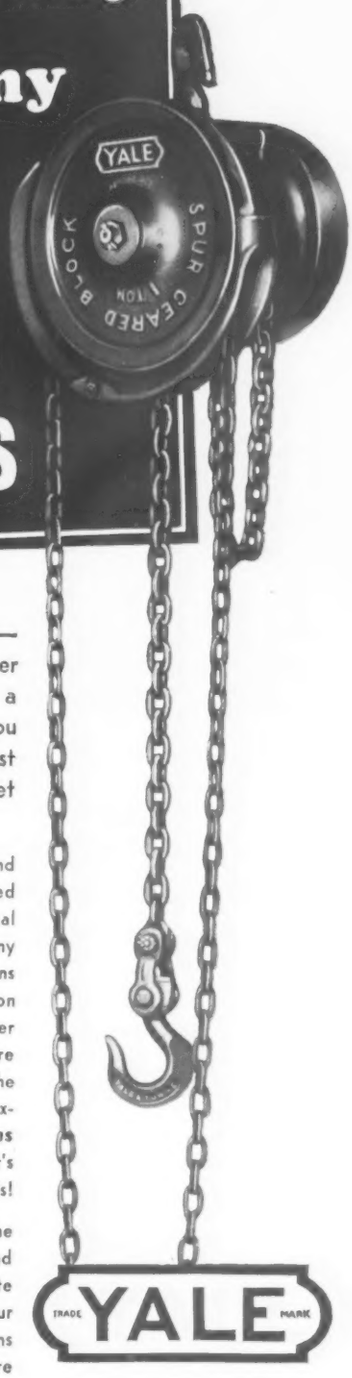

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board of commissioners has plans maturing for new county-owned electric light and power plant estimated to cost about $148,000, with engine-generator units and accessories. Financing has been arranged, and work will begin soon. (Noted April 25).

Mississippi

ABERDEEN, MISS.—City receives bids July 22 for electric light and power distribution system, costing approximately $105,000. Beard Engineering Co., 2606 Oakview terrace, St. Louis, engineer.

North Carolina

FAYETTEVILLE, N. C.—Pepsi-Cola Co., R. B. Minges, head, plans installation of power equipment in new one-story beverage bottling plant on local site. Work will begin soon. Robert L. Clommer, Hickory, N. C., architect in charge. (Noted June 27).

NEWTON, N. C.—City plans constructing generating system for electric current. E. Houpt is mayor.

SHALLOTTE, N. C.—Town, R. D. White, chairman electric commission, plans constructing power plant to supply town and nearby territory. E. D. Bishop, mayor.

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Missouri

ST. LOUIS—St. Louis & San Francisco railroad will commence work immediately on erection of a coal chute costing $100,000 at Jonesboro, Ark.

ST. LOUIS—Steel Sales Corp., 4067 Park street, has let contract to L. O. Stocker Co., Arcade building, for erection of one-story, storage and distributing plant, 100 x 340 feet, at McRae and Vandeventer avenues, to cost approximately $125,000; will install two electric traveling cranes, hoists and other mechanical equipment; also air conditioning system. H. A. Durr Co., 123 West Madison street, Chicago, consulting engineer. (Noted June 27).

Oklahoma

CORDELL, OKLA.—City council plans extensions and improvements in municipal electric light and power plant, including installation of additional equipment. Cost close to $60,000. V. V. Long, Colcord building, Oklahoma City, Okla., consulting engineer.

Wisconsin

BLACK RIVER FALLS, WIS.—City council has engaged Mead, Ward & Hunt, consulting engineers, Madison, Wis., to make survey of municipal generating plant with view to installing auxiliary equipment to diesel plant.

LA CROSSE, WIS.—Palmer A. Hanson will soon start construction of a one-story addition to sheet metal plant, 40 x 140 feet.

SUPERIOR, WIS.—Pure Oil Co. and the Western Oil & Fuel Co., 227 Colfax avenue, North, Minneapolis, has awarded contract to Barnett & Record Co., Flour Exchange building, Minneapolis, for construction of a lake terminal having storage capacity of 345,000 barrels of gas and oil.

WISCONSIN RAPIDS, WIS.—Bethke Motor Co., Chevrolet dealer, has placed contracts for erection of new garage and service building, 70 x 130 feet, estimated to cost $30,000 completely equipped.

Minnesota

AUSTIN, MINN.—PWA has allotted funds for construction of a sewage disposal plant addition to cost $325,280. G. L. Brown is city engineer.

BLUE EARTH, MINN.—City, Walter Enger, clerk, has filed application with PWA for grant to construct sewage disposal plant costing $175,200. Burlingame, Hitchcock & Estabrook, 521 Sexton building, Minneapolis, consulting engineers.

HIBBING, MINN.—Village, J. H., Raugh, village engineer, has filed application with PWA for grant to construct sewage disposal plant costing $349,999. (Noted April 25).

MADELIA, MINN.—C. E. Seymour, village clerk, will receive bids until July 19 for construction of a municipal light, heat and power plant, including generating machinery and equipment, distribution system and power house. Burlingame, Hitchcock & Estabrook Inc., Sexton building, Minneapolis, engineers.

OWATONNA, MINN.—PWA has allotted funds for construction of a sewage disposal plant costing $145,000.

ROSEAU, MINN.—Village, J. O. Juvrud, president of village council, has filed application with PWA for grant to construct sewage disposal plant costing $67,800. Lium & Burdick, Grand Forks, N. Dak., consulting engineers.

SHERBURN, MINN.—Village, care of E. Risely, clerk, plans municipal electric power plant. Cost estimated at $100,000.

ST. PAUL—Chicago, Milwaukee, St. Paul & Pacific Railway Co. plans construction of a round house addition and extension, 110 feet in length, to cost about $30,000.

Texas

ABILENE, TEX.—City council plans construction of new electric-operated pumping station in connection with extensions in waterworks filtration plant and other improvements in water system. Cost $400,000. Hawley, Freese & Nichols, Capp building, Fort Worth, Tex., consulting engineers. (Noted June 13.)

COMANCHE, TEX.—City has appointed Albert C. Moore & Co., San Antonio, Tex., consulting engineer, to determine advisability of constructing municipal electric lighting plant and distribution system. John E. Hoff, mayor.

EDINBURG, TEX.—Spreckles Sugar Co., 2 Pine street, San Francisco, has tentative plans for erecting beet sugar plant near here.

GREENVILLE, TEX.—City plans erecting municipal light and power plant, diesel engine unit. Cost $100,000.

HUNTSVILLE, TEX.—Texas prison system, state prison board of control, is taking bids for electric power plant, including diesel motor unit to generate electric power for entire prison plant.

LUFKIN, TEX.—Southland Paper Mills Inc., Lufkin, recently organized, E. L. Kurth, president, plans power house and pumping station at proposed new local news print mill on which work is scheduled to begin this summer. Cost over $5,000,000. George F. Hardy, 305 Broadway, New York, consulting engineer.

Kansas

KANSAS CITY, KANS.—Meyer Kornblum Packing Co., 300 Central avenue, plans installation of electric power equipment in new two-story addition to meat packing plant, 40 x 120 feet, for which bids will be asked soon on general contract. Entire project to cost about $50,000. Carl Schloemann, 6329 San Bonita avenue, Clayton, Mo., is architect.

North Dakota

GRAND FORKS, N. DAK.—PWA has allotted funds for construction of an incinerator costing $80,000.

JAMESTOWN, N. DAK.—Board of administration of North Dakota, A. B. Welch, secretary, has filed application with PWA for funds in the alteration of power house and equipment costing $154,545. William F. Kurke is engineer.

MINOT, N. DAK.—Board of administration of North Dakota, A. B. Welch, secretary, has filed application with PWA for funds in the alteration of power house and equipment costing $63,636. William F. Kurke is engineer.

VALLEY CITY, N. DAK.—Board of administration of North Dakota, A. B. Welch, secretary, has filed application with PWA for funds in the alteration

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of power house and equipment costing $30,909. William F. Kurke is engineer.

South Dakota

FLANDREAU, S. DAK.—City, Dr. S. L. May, mayor, has filed application with PWA for grant to construct sewage treatment plant at cost of $43,100. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, consulting engineer.

RAPID CITY, S. DAK.—South Dakota state highway department has awarded contract to Henry H. Hackett for construction of a one-story district shop building, 80 x 120 feet, to cost about $50,000. Andrew Norstad, Pierre, S. Dak., is secretary of state highway commission.

YANKTON, S. DAK.—PWA has allotted funds for the construction of a waterworks plant costing $63,636.

Nebraska

HASTINGS, NEBR.—Central Nebraska Power & Irrigation district, R. O. Canaday, secretary, will receive bids until July 20 for a 25,000-horsepower vertical shaft Francis turbine and auxiliary equipment for Johnson No. 2 power plant on the $30,000,000 central Nebraska irrigation and power project. H. S. Hunt, Jackson, Mich., consulting engineer.

HAY SPRINGS, NEBR.—Mirage Flats Public Power & Irrigation district, Earl S. Horn, secretary, has filed application with PWA for funds to develop power facilities costing $764,742. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, Nebr., consulting engineer.

PLAINVIEW, NEBR.—City, F. W. Culbertson, mayor, has filed application with PWA for funds for construction of an addition to power plant costing $58,940. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, is consulting engineer.

SCHUYLER, NEBR.—City will file application with PWA for grant to improve power plant including 1000-kilowatt turbine, switchboard and building addition costing $110,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers.

Iowa

ANAMOSA, IOWA—City, John W. McNamara, mayor, has filed application with PWA for grant to construct sewage treatment plant and intercepting sewers at a cost of $112,288. H. R. Green Co., Cedar Rapids, Iowa, consulting engineer.

COGGON, IOWA—City, Clair Freeman, mayor, has filed application with PWA for grant to construct sewers and sewage treatment plant at cost of $50,562. H. R. Green Co., Cedar Rapids, Iowa, consulting engineer.

DAYTON, IOWA—City, George Tarrant, clerk, has filed application with PWA for grant to construct an electric light plant and distribution system costing $50,000. Ralph W. Gearhart, Cedar Rapids, Iowa, consulting engineer.

DAVENPORT, IOWA.—Red Jacket Mfg. Co., pump manufacturer, Rockingham road, has awarded contract to Priester Construction Co. for erection of an assembly plant to cost $40,000.

DES MOINES, IOWA—State board of control, M. R. Pierson, secretary, has been authorized by the legislative interim committee to install boilers at state institutions as follows: Eldora, $17,500; Oakdale, $19,500; Fort Madison, $48,000; Independence, $36,000; Mt. Pleasant, $24,000.

MUSCATINE, IOWA—Muscatine county has awarded contract to Otto Wendling for construction of a one-story county maintenance shop for highway equipment, 36 x 118 feet. B. F. Snyder is county auditor.

SIBLEY, IOWA—City, E. H. Koopman, mayor, has filed application with PWA for grant to construct additions to power plant at a cost of $151,642. Burlingame, Hitchcock & Estabrook, 521 Sexton building, Minneapolis, consulting engineers.

SUTHERLAND, IOWA.—City, K. J. Reiste, mayor, has filed application with PWA for grant to construct a waterworks plant costing $48,364. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, consulting engineer.

WATERLOO, IOWA—City will soon take bids for construction of a sewage disposal plant and system to cost about $1,000,000. City has been allotted PWA grant of $491,158. Knapp F. Matthews is city clerk.

Montana

BOZEMAN, MONT.—Montana State college plans construction of one-story additional shop unit, 50 x 182 feet. Fred F. Willson, Gallatin building, architect.

POLSON, MONT.—Construction has been started on an oil refining plant for fuel, tractor and heavier oils. F. W. Anderson, Billings, Mont., is one of the owners. Equipment will be installed as work progresses for a topping plant with a daily capacity of 8000 gallons.

Pacific Coast

HUNTINGTON PARK, CALIF.—Desser Tire Products Co., 6211 Cottage street, will install electric power equipment in connection with rebuilding portion of automobile tire manufacturing plant recently destroyed by fire.

GLENDALE, CALIF.—A certificate to conduct business under the firm name of Commonwealth Sheet Metal Mfg Co. at 6313 San Fernando road, Glendale, has been issued to the owner, E. Allen Kent, Glendale.

LOS ANGELES—Gold Seal Tank Corp. has been organized with capital stock of $100,000. Directors are Leon Eccles, Harrison Lemond and Charles G. Kibbe Jr., all of Long Beach, Calif.

MERCED, CALIF.—City council plans purchase of air compressor and accessories.

SACRAMENTO, CALIF.—Bercut-Richards Co. will install electric power equipment in connection with rebuilding portion of local food product canning and packing plant. Work to begin soon. (Noted June 20).

SOUTH GATE, CALIF.—A certificate to conduct business under the firm name of South Gate & Pipe Supply Co. at 3200 Ardmore avenue, South Gate, has has been issued to the owner, Edward Ehinger, 9820 Otis street, South Gate.

HOOD RIVER, OREG.—Hood River Apple Growers association plans installation of electric power equipment in new packing plant, replacing building recently destroyed by fire. Will install conveying and other mechanical handling equipment. W. Q. Bateman is manager.

SPOKANE, WASH.—Alex Lindsay, water superintendent, has proposed a $400,000 pumping plant and a $300,000 reservoir as a PWA project. Obsolete machinery will be replaced if proposed plans are adopted.

TACOMA, WASH.—Tacoma Sash & Door Co., Fifteenth and Dock streets, will install electric power equipment in new one-story plant for manufacture of sash, doors and other millwork products. (Noted June 20).

Canada

KITCHENER, ONT.—Water commission wants prices on two electrically-driven pumps with total capacity of 1,000,000 gallons. M. Pequegnot, City hall, is superintendent.

REGINA, SASK.—General Motors of Canada Ltd., J. B. Highfield, plant manager, Oshawa, Ont., will purchase and install machinery at plant here. Cost $75,000.

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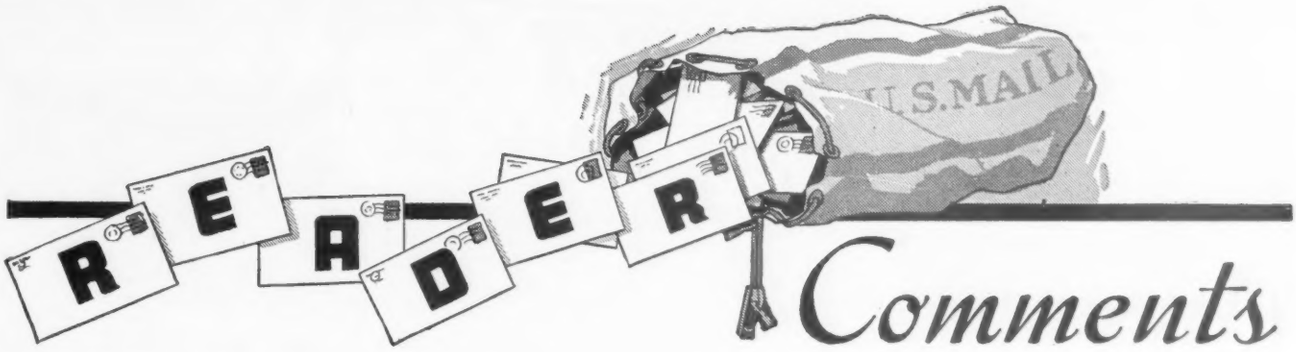


Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Auto Industry for India

To the Editor:

India will soon have an indigenous motor car factory, should the efforts of the minister for labor and industries, Madras, and Sir M. Visvesvaraya succeed.

It is understood that a conference of ministers of industries of all provinces in India and experts in a position to give technical advice regarding the automobile industry will shortly be convened to prepare a scheme.

Sir M. Visvesvaraya drew up a scheme for a motor car factory in 1935, according to which the proposed factory was to be located at Sewri (Bombay) or Jamshedpur. His scheme was placed before a group of Indian financiers for consideration. This group is, however, understood to have decided that the financial implications and prospects of the scheme should be further considered.

Sir M. Visvesvaraya's scheme depends for its success upon two fundamental considerations. The one is that the proposed company should come to an agreement with some well-known and well-established firm of foreign manufacturers, whereby its engines could be assembled in India, and fitted to Indian-built bodies. It is not yet known whether any such agreement has proved feasible.

The other condition is that the output of the proposed factory should be encouraged by the government of India, and that the present scale of duties on imported cars and lorries should be maintained for a definite period of time on a protective basis. It is not known whether Sir M. Visvesvaraya has been successful in his efforts to enlist the support of the government of India for his scheme in the above two directions.

Matters remained unchanged for a time, but with the advent of congress government in seven provinces out of ten, the whole outlook has taken a turn for the better. Sir M. Visvesvaraya is now able to secure the sympathetic attention of seven provincial governments in respect of his scheme. Further a number of Indian states are understood to be sympathetically disposed towards his scheme. Such being the case, Sir M. Visvesvaraya's ability to float a concern for the manufacture of motor cars in India is within the range of practical possibility in the next few months.

A. P. SOM

Jamshedpur, India.

Older Men Have Skill

To the Editor:

Discrimination against older employes is not only unfair, it is sheer ignorance and a miscalculation because they are the men whose skill and experience are the brains of the shop, and it is they who keep the wheels going around. What amount of experience can a young fellow bring into the shop? It is us oldsters who have been through the mill, who know "what, how and when to do it."

C. F. Bennett, president of Stanley Works in New Britain, Conn., ably expressed himself (STEEL, June 20) when he said "that men of much greater age than the 45-year limit still retain and increase their skill, which, with the much better judgment which they acquired by these years of employment, makes them of greater value to the company."

This was well said and gospel truth, and will be found so by many of the best companies in this country, who honor and respect these older employes (as may be seen by the groups of old employes occasionally shown in magazines and papers).

I am approaching my seventy-eighth year, am just as clear minded and alert as when I was 45. I am 16 years with my present employers, whom I know regard me as an able workman, and there are many oldsters whose experience is an asset to their employers.

Therefore, Mr. Employer, put an older and experienced man at the wheel, he'll know how to make it run smoothly and you will be the gainer in the end.

I do not mean to say that the younger ones are not entitled to a "chance", but it still takes the oldsters to show them "what, how and when to do it".

P.S.—If this should appear in your magazine, please omit full name.

E. L. S.

Cleveland

Blames It on Washington

To the Editor:

I glanced rather hurriedly through recent copies of STEEL but picked up a few copies to go over at bit more carefully in a lull.

In the June 13, 1938, number there is a comparison of strikes in England and the United States.

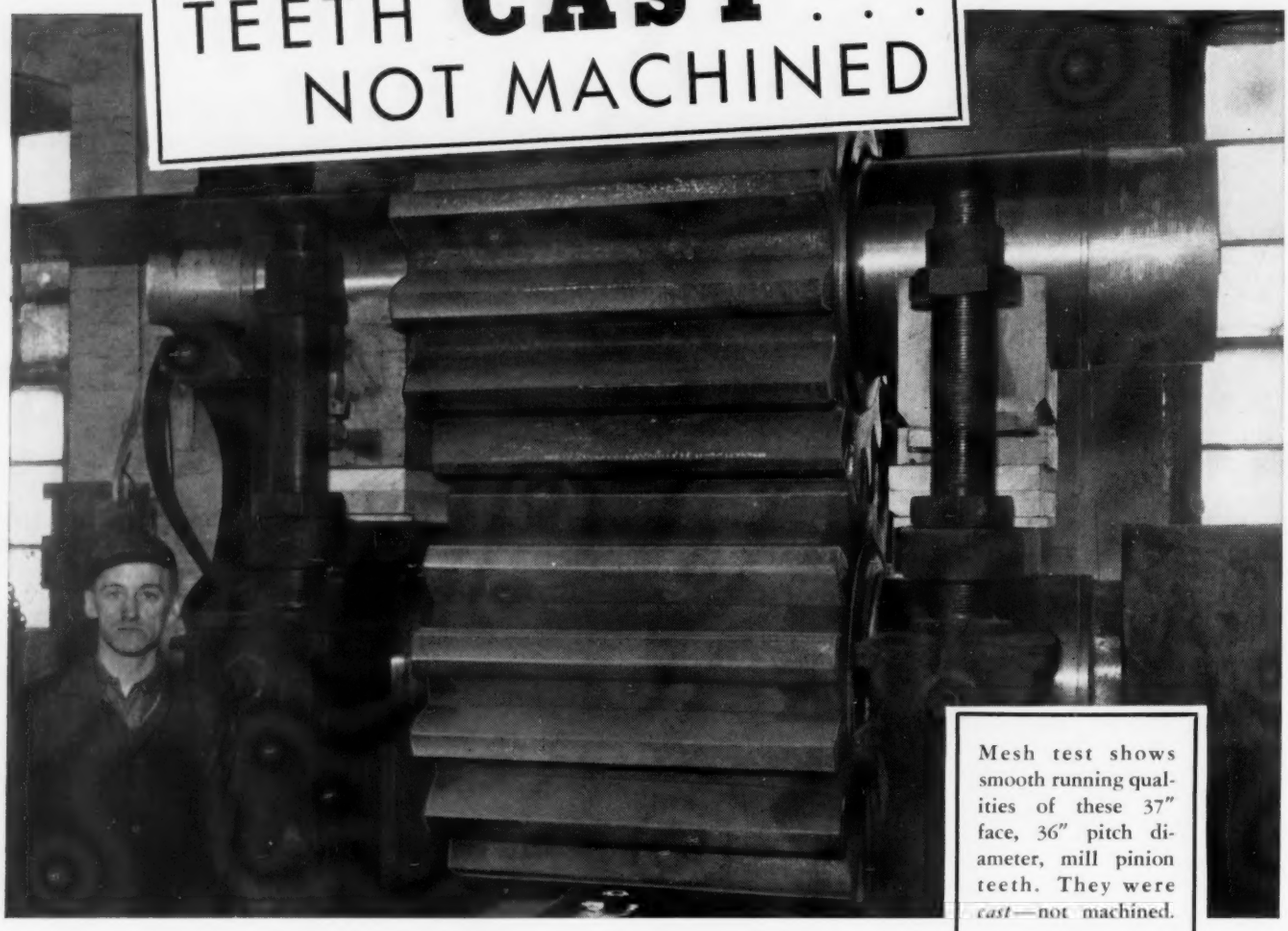
On page 16 there is a comparative graph. The title would lead the reader to believe that the depression was responsible for the condition starting with 1932. I have found nothing in the text to alter this.

Why not state the true case—the result of the silver tongued maunderings of the Great White Father in Washington, or would that not be editorial policy?

C. W. HOLMQUIST

General Superintendent,
Copperweld Steel Co.,
Glassport, Pa.

TEETH **CAST** . . . NOT MACHINED



Mesh test shows smooth running qualities of these 37″ face, 36″ pitch diameter, mill pinion teeth. They were *cast*—not machined.

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